Department of Economics

Faculty of Economics and Social Sciences

Chair of International Economics and Regional Economics

Thierry Madiès, ordinary teacher

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Public-Private Partnerships: Theoretical Framework, Empirical Evidence and the Case Studies of Germany and Switzerland

Under the supervision of Prof. Thierry Madiès

Chair of International Economics and Regional Economics

University of Fribourg, Switzerland

and Prof. Hannu Laurila

Department of Economics and Accounting

University of Tampere, Finland

Gaëtan Bidaud

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To Christina and Lionel

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Abstract

In the chapter 1, the theoretical framework of Public-Private Partnership (PPP) is presented in order to highlight the advantages and limits of this particular way to provide public utilities. I first show the main differences between PPP, traditional public procurement and privatization and, second, the efficiency of PPP, according to theoretical models. Then, in the chapter 2, the evolution of PPP projects in Europe from 1990 until today is shown, as well as empirical issues concerning PPP and more generally public procurement. Finally, the case studies of the PPP markets in Germany and Switzerland are developed in the chapter 3.

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Introduction

Since de middle of the 90's, governments turned towards a new way of offering public facilities in collaboration with the private sector, namely the so-called Public-Private Partnership (PPP). The UK is known as being the first country that resorted to PPP with the Private Finance Initiative (PFI) program, which involves a strong cooperation between the public and the private sector, as well as private financing for public utilities. Following the UK, some industrialized countries and developing countries also started to use PPP schemes. However and despite this increasing use, it remains difficult to give a precise definition of PPP. Indeed, the literature on the topic offers several ways and has trouble to agree on a common definition. Moreover, PPPs are strongly dependant on the institutional and legal frameworks in which they are anchored. Therefore, each country defines them differently. For instance, the following definition given in the green paper of the European Commission concerning PPP could hardly be hazier:

> « In general, the term [PPP] refers to forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a [public] service. »
> *Source: European Commission (2004, p. 3).*

According to the Organisation of Economic Co-operation and Development (OECD, 2008, p. 16), this lack of definitional clarity can be explained by the fact that PPPs traditionally fill a broad space between traditional public procurement and privatization. Therefore, it is worth defining these both notions before understanding in what PPPs are different, which is done in the chapter 1 of this paper. The OECD also suggests the following definition of PPPs, more precise than the own given by the European Commission:

> « A public-private partnership [is] an agreement between the government and one or more private partners (which may include the operators and the financers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of

> the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners. »
> *Source: OECD (2008, p. 17).*

In Switzerland, the lag concerning PPPs relatively to its European neighbours makes it hard to give a definition of PPPs. Nevertheless, in one of the rare practical studies about PPP in Switzerland, lead by the ETH Zürich for the Federal Office of Roads, a precise definition is given, based on the PPP literature. This definition encompasses several key points of PPP and then should be given here:

> « PPP designates contractual co-operation between the public sector and the private economy, based on a long-term partnership. The partnership aspects are constituted in order to reach the complementary and operational goals of both partners. The main goal of PPP is increasing the efficiency and reached *via* the partners resources allocation, the risk sharing between these partners as well as life-cycle and process orientation of the production of the goods and services. The public authority holds the sovereign function within the partnership. Governance, operation and financing functions are individually divided between the partners. The object of a PPP is the fulfilment of public duties according to their scope of work, which can include projects with investing characteristics as well as without. »
> *Source: Bundesamt für Strassen (2008, p. 740, translation).*

In the first chapter of this paper, PPPs are first put in the context of public provision and distinguished from traditional public procurement and privatisation. The absence of a formal commonly accepted definition lead searchers to define PPPs *via* their characteristics, namely long run contracts, bundling of the tasks of building and operating the asset, risk sharing between the public sector and the private partner(s) and a private financing in some cases.[1] These different elements

[1] Financing of the project is usually shared between the private sector and the public sector. However, the financing scheme broadly varies from a PPP to another. Therefore, one cannot say that the private sector finances the whole project on its own within PPP.

are indeed crucial insights concerning the efficiency of PPP, relatively to more traditional forms of public procurement.

Therefore, in the second part of chapter 1, these points are studied from a theoretical perspective. Several models based on the theory of incomplete contract, of which the main sources related to PPP are the articles of Hart *et al*. (1997) and Hart (2003), are thus presented. The so-called advantages of PPP (it is often claim that PPPs are able to involve gain of efficiency of 20 percent in comparison with traditional procurement) are discussed and criticized. The section 1.2 treats therefore respectively of task bundling, the risk sharing and the financing of PPP projects. The main insight of this section is to show that PPP are not more efficient that traditional procurement *per se*. Indeed, a certain number of conditions must be fulfilled in order to reach such efficiency; otherwise the public sector has better to use more traditional schemes.

A substantial part of the PPP theory is also linked to the auction theory and the transaction costs theory. Nevertheless, due to a lack of time and place, these elements have not been treated in this paper.

In the chapter 2, the evolution of the PPP market in Europe is first detailed. After starting in the UK, PPPs have been spread to continental Europe. According to Kappeler and Nemoz (2010), there are more than 1300 PPP projects that have been launched in Europe since 1990, for an amount of about €240 billion. Despite the importance increase of PPPs in continental Europe, the UK stays the most important country in terms of number of PPP in 2010, with more than 37 percent of the total. However, for the first time in twenty years, Spain took the first place in terms of value (i.e. financial amount) of PPP projects.

About the sectors concerned by PPP in Europe, the one of *transport* is the most important in continental Europe, whereas in the UK the sectors in which PPPs are the most frequently used are *education* (schools, day-care services) and *health* (hospitals). In 2010, in Europe (including the UK), the sector *education* accounted for 34 percent of the total number of PPPs, followed by *transport* with 21 percent and *health* with 17 percent.

Moreover, the maturity of the PPP market in the UK made realisable the analysis of the efficiency of several services undertook under PFI schemes.

Indeed, the National Audit Office offers studies concerning results obtained by such services in terms of costs, prices and time delivery. The studies of the public infrastructure building in the UK and of PFI hospital contracts are developed in the subsection 2.1.3. They mainly point out that PFI mostly reached the expectations of the public authority. However, regarding to these analysis, one cannot say that PFI (and more generally PPP) provides services less costly and better in terms of quality than traditional procurement.

Therefore, the section 2.2 shows several empirical studies concerning PPP in different sectors. The goal of this section is to provide a few examples about variables used in these researches, the econometrical methodologies as well as the diverse results obtained. The purpose is thus not to do a complete survey of empirical PPP studies, but to show which are the issues studied by the searchers active in the PPP field and to offer several lines of though for further works. The results of these studies are in accordance with the insight of the theoretical part presented in the chapter 1. Indeed, while some studies conclude that PPPs lead to more efficiency than traditional public procurement, some others estimate that resorting to traditional provision is better.

Finally, two case studies are developed in the third chapter, namely the cases of Germany and Switzerland. Indeed, Germany is an interesting country in terms of PPP because it developed a real PPP politics since 2000. Furthermore, this country seems to be the best able to be a good example for Switzerland. The first part of the German case is devoted to an empirical description of the evolution and the actual state of the PPP market. The second part concerns the implementation process of PPP in the institutional, political and legal frameworks. The creation of Task Forces and Centres of Excellence seems to be in that respect a crucial element for the development of PPPs in a country.

Concerning Switzerland, the few studies conducted until today shows an important lag in terms of PPP relatively to other developed countries. The causes explaining such a lag generally evocated are therefore presented in the section 3.2. Nevertheless, the interest in PPPs in Switzerland has recently grown and several steps have already been made. In that respect, the association *PPP-Schweiz* has for instance been founded in order to stimulate and promote the resort to PPPs in

Switzerland. Moreover, some projects like the « Maladière Stadium » in the city of Neuchâtel and the Greater Zürich Area are seen as PPPs. However, the potential of PPPs remains very important in Switzerland. Then, the last subsection of this work focuses on sectors that are potentially interesting for PPP in the country.

To conclude, it must be mentioned that this paper does not attempt to evaluate the efficiency of PPPs projects in Switzerland. Indeed, due to a lack of time and data, the part concerning Switzerland remains only descriptive. However, the theoretical frameworks and the empirical evidences given is the chapters 1 and 2 offer lines of though for further developments about PPPs in Switzerland.

Chapter 1 Theoretical Framework of PPPs

Since the beginning of the 1990s, governments have moved towards an increasing use of PPPs in the industrialized countries as well as in the developing countries. In order to understand the reason of such a significant interest, we must first precise in which way the PPPs projects differ from other kind of public procurements. That will be the object of the section 1.1. Then, the advantages and the limits of that kind of cooperation between the public and the private sectors will be pointed out in the section 1.2 in order to highlight when a PPP should be undertaken and when a more traditional public provision should be preferred.

1.1 PPPs in the Scope of Public Procurement

A part of this paper is dedicated to the development of PPPs in Switzerland. Thus. the first step is to clearly distinguish PPPs from other kinds of public provision. According to the OECD (2008, pp. 16-18), the literature not altogether agrees about what a PPP is. It shows that there are differences between the definitions given by the International Monetary Found (IMF), the European Investment Bank (EIB) or by the European Commission. The reason referred by Grimsey and Levis (2005, p. 346) is that « generally speaking, PPPs fill a space between traditionally procured government projects and full privatization. » They also notice that several authors estimate that PPPs appear to be nothing more than a kind of privatization. I will show that this statement is wrong, but first, the definitions of the traditional state procurements and the privatization have to be given.

1.1.1 Traditional State Procurement

In the case of a traditional public procurement (also called in-house provision), the state finances and designs the project on its own. Then, it sets up a public offer in order to find one or more private firms that are in charge of building the infrastructure.[1] Once that step is done, the public sector can either decide to manage the operating and maintenance stage itself, or to enter into a new contract with a private firm (Bennett and Iossa, 2002; Grimsey and Lewis, 2004). In that kind of public procurement, the state is the provider of the service. Thus, the

[1] The conditions of that process are specified in the public market law.

relationship of the private sector to the public sector is more like an employee – employer relationship. According to Lawther (2002, pp. 33-34), « there is a hierarchical relationship that clearly identifies the public agency as the 'boss' or the customer. » The author also lists the most important characteristics of traditional procurement. First, the object of the contract should fit with at least one of the following categories: (i) little complexity or uncertainty of the product/service, (ii) a great deal of public and private knowledge concerning the best way to deliver the service and (iii) the existence of « an accepted set of principles, methods, and materials used to deliver the service. » Second, the private actor is paid by the public agency to deliver the service, playing the role of a « contract administrator. » Third, the contract will generally run on short term.

Regarding to the difference with PPPs, the third point is important. Indeed, the duration of the contract is a key point concerning PPPs, and a substantial part of the literature is devoted to the formalities of these contracts. Another important issue stressed by Corner (2005, p. 45) is that, in the case of a traditional procurement, the state bears every risk related to the project. As discussed later in this chapter, the distribution of the risk is a major factor of, first, the distinction between PPPs and traditional provision and, second, the efficiency of PPPs contracts.

1.1.2 Privatization

According to Vickers and Yarrow (1991, pp. 111-112), privatization occurs in three different cases: (i) the transfer from the public to the private sector of a competitive firm, operating in a market without important market failures; (ii) the transfer from the public to the private sector of a monopoly; and (iii) « contracting out publicly financed services, previously performed by public sector organizations, to the private sector. » However, more recently, Layne (2000, pp. 22-23) notes that the literature about privatization defines it in a larger way than just considering it as a transfer from the public sector to the private one. Indeed, some authors put more the accent on the role of the state, especially when the state uses privatization as an intervention tool.

Since the middle of the eighties, an increasing number of industries, which were before owned by the state, have been privatized. For instance, in UK,

following the privatization program of 1979, the main fields concerned by privatization were ports, telecommunications, gas, airports, electricity and water (Holder, 2000, pp. 52-60). According to Nestor and Mahboobi (2000, p.15), the objectives of the governments were at a time political, economic and financial. These economic motivators are most interesting for my paper. Indeed, it is important to keep in mind that one of the reasons why governments switched from nationalization to privatization was the seek of efficiency, arguing that in most cases the private sector provides better quality and has more incentives to reduce costs than the public sector. To prove it, Nestor and Mahboobi notice that « the evidence on privatisation experience to date has consistently shown that a change in ownership has improved performance considerably at the firm level, both in terms of productive efficiency and profitability. »

However, privatization does not only show advantages. First, regarding to the function of the public utilities, the fact that « privatised activities are not expected to serve a public policy function » (Välilä, p. 100) can lead to an inadequacy between the objectives of the private sector and of the public sector. Indeed, it is well known that the private sector seeks profit and the improvement of the efficiency of the production, whereas the state has also to consider some welfare and political objectives.

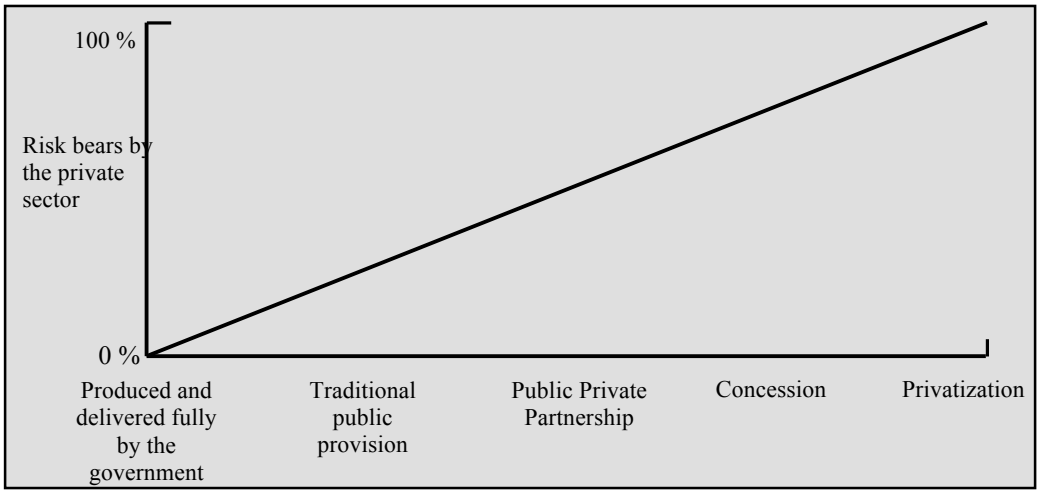
The second problem, which is maybe one of the reasons that explain the previous issue, is that the risk is in theory not shared between the public sector and the private firm (Välilä, p. 100). I say *in theory,* because in practice there actually is a real link between them. In fact, in most cases the public sector cannot let fail a privatized firm that manages public utilities precisely because of the welfare objectives that are hidden behind those services.

To sum up, a main issue of both traditional procurement and privatization is the question of how the risk is shared between the state and the private partner(s). In the next subsection, I will reason along this insight to show the main differences between PPPs and other kind of public procurements. Following this, in section 1.2, the advantages of PPPs will be analysed, regarding to the issues stressed below.

1.1.3 The Differences between traditional procurement, PPPs and Privatization

In the case of a traditional procurement, the state manages all the steps of the construction of an infrastructure and the operation of the service, even if it turns actually to the private sector at the different level to effectively manage the tasks. Concerning privatization, the opposite situation arises, because the private firm can operate on its own and seek for profit under several conditions more or less flexible. Thus, the control from the state decreases. One of the main differences between PPPs, traditional procurement and privatization is precisely this degree of control that the state keeps. Indeed, PPPs projects are situated between the two other ways of providing utilities previously shown and there is an important number of combinations that enter in the scope of PPPs.[2]

Figure 1.1 The degree of risk sharing in the scope of public procurement[3]



Source: OECD (2008, p. 20).

The role of the state in building and operating stages implies different degrees of risk sharing between the public sector and the private sector. The OECD (2008, pp. 19-21) stresses this point to distinguish PPPs from other forms of public procurements and privatization. The figure 1.1 illustrates the possible combinations of this risk sharing, in a scale from a service completely delivered by the government to a service delivered by the private sector. It shows a

[2] For a complete list of the different PPP schemes and their modalities, see Hemming *et al.* (2006, p. 6) or Bolz (2005, p. 27).

[3] The OECD distinguishes PPPs contracts and concessions. However, the literature often considers concession contracts as a main type of PPPs (see Athias, 2009b; Engel *et al.*, 2007; Klijn and Teisman, 2005). Thus, in this paper, the term PPP includes concessions.

relationship between the degree of the involvement of the private sector in the project and the risk borne by it. However, the term *risk* has to be clarified. Indeed, it is not precise enough to claim that the public sector bears less risk with PPPs than with traditional public provision, and more than with privatization. According to Hemming *et al.* (2006, p. 12), the risk can be divided into five categories:[4]

- **Construction risk**: related to design problems, construction costs and project delays;
- **Financial risk**: related to variability in interest rates, exchange rates, etc.;
- **Availability risk**: related to the continuity and quality of service provision;
- **Demand risk**: related to the ongoing need for service;
- **Residual value risk**: related to the future market price of the asset.

In order to understand how the risk is really shared between the private sector and the public sector in a PPP, the various risks mentioned above must be studied separately. However, the insight in this subsection is not to analyse the efficiency of such a risk sharing (that will be the object of the section 1.2), but to show *how* the risks are shared. Beforehand, it is important to precise that the projects delivered by the state government are generally large and/or unique. Therefore, each of them have their own combination of risks and « some risks are more relevant than others », depending on the kind of project (Corner, 2005, p. 45). For instance, it is obvious that the construction of a tunnel does not involve the same level of each risk than a school. Indeed, a tunnel may include many construction risks that are not relevant for a school, related to geographic conditions or technical problems. In contrary, the operating phase of a school may embrace much more elements. Moreover, imagining a payment system based on user

[4] For Grimsey and Lewis (2002, p. 111), nine risks face an infrastructure project. In addition to the ones listed above, they mention the *force majeure* risk, regulatory/political risks, environmental risks and project default (failure of the project due to a combination of any other risks). Iossa *et al.* (2007, pp. 18-20) separate the risk into ten different categories. However, they can mostly be brought together into the five risks studied in this paper.

charge for a tunnel, it can hardly be applied to a school, and therefore the demand risk sharing will differ from one project to another.

First, the issues related to construction risks are relatively simple. Indeed, in most PPPs projects the designing and building phases are committed to the private sector, within for instance the so-called design-build-finance-operate (DBFO) schemes (see Hemming *et al.*, 2006, p. 6). Thus, the private firms involved bear the risk of the cost and the time related to the construction.

Second, the financial risk is more subject to discussion in the literature concerning PPPs. On the one hand, one argues that an advantage of PPPs is that they alleviate the budget of the government, because the private sector is in charge of financing the project. If that is true on the short-run and concerning the initial and generally heavy investments, on the other hand the state also has to spend money. Indeed, the OECD (2008, p. 46) shows that, when the state is not directly involved in financing the project at the beginning and when there are no user fees (or if they do not cover fully the costs), it will, « on a regular basis and as part of its current expenditure, pay the private partners a fee for services delivered. » Strictly speaking, eventually the private sector, which borrowed the founding in order to build the infrastructure, bears the risks related to change in interest rate. However, via these payments it has to do, the public sector also bears a part of the financial risks. Moreover, the financing is, in most cases, split between the state and the private partner. The following example illustrates a case in which the state and the private sectors are both involved in financing the project:

> The M1-A1 link is a highway connecting the M1 highway close to Leeds and the A1 highway close to Wetherby in UK. It was one of the four major projects set up by the British government in the 1990s. As the public opposition against direct user charges for the use of the road was strong, the partners implemented a so-called shadow tolls system, based on the volume of traffic using. Namely, the government had to pay the shadow tolls over the term of the contract. Thus, it bears the project funding risk because it has to find various sources of revenue. However, the private concession team took the traffic and financing risks, as it needed a level of traffic high enough to cover the costs and get a good rate of return on their investment.
>
> *Source: AECOM Consult, Inc. (2007, pp. 3.26-3.31).*

The third risk is the availability risk. As the construction risk, it is, most of the time, the private sector bearing the risk that might occur during the service provision phase. However, the public sector is involved in any case. Actually, when the user is not satisfied with the quality of the offer and as she knows that it concerns public utilities, she will complain naturally to the government and not necessarily to the private firm. Concerning the risk related to the residual value, it depends on whether the asset is owned by the government or by the private partner at the end of the contract.

The most important risk, to which a large part of the literature is devoted, is the demand risk. The uncertainty of the future implies that it is often hard to guess how the demand of a service will develop. As PPPs are in most cases long-run contracts, it is even more difficult to predict. Thus, when changes occur, the private partner should be able to adapt the quantity and the quality of the service. Therefore, the contract should be as flexible as needed. Concerning PPPs, whether the demand is borne by the private sector or by the public sector depends on the type of contract. According to Iossa and Martimort (2008, p. 21), there are three main payment mechanisms that involve a different demand risk sharing.[5] First, when the payment system is *only based on user charges*, the contractor bears all demand risk, because she gets all his revenues from the fees paid by the users. Second, when the payments are based on *usage*, the state collects user fees and pays the private partner afterwards. In this case, « the allocation of demand risk depends on the relationship between the payment and the actual usage level. » Third, payments based on *availability* imply that the government bears all the demand risk, because the payment does not depend on the actual usage.[6] As mentioned by Iossa and Martimort, in reality the payment includes, most of time, a combination of those three schemes.

Consequently, the risk sharing is not completely clear and depends on the kind of project. However, according to Engel *et al.* (2007, pp. 40-41), it is the way of how the risk is shared that makes the difference between PPP and privatization.

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[5] For more details about how tariffs are set up in the different payment system, see Iossa *et al.* (2007, pp. 40-49).

[6] Athias (2009) distinguishes two main forms of contract: availability contract, where the private sector bears nor risk, and the concession contract, where the private partner bears the demand risk.

The authors argue that « as far as the risk profile of the government's budget is concerned, PPPs are much closer to public provision than to privatization. » Indeed, in the privatization case, all the risk is transferred in one time to the private sector, when a more or less significant part of it is still borne by the government in a PPP.

To sum up, the main characteristics of PPPs, which distinguish them from traditional public provisions and privatization, are the tasks bundling, the risk transfer and their long-term nature (Iossa and Martimort, 2008, p. 4). The objective of the following section is to use those distinctions for studying the efficiency of PPPs and whether or not the state should resort to them. The table 1.1 summarizes the major differences between public private partnerships and traditional procurement.

Table 1.1 Main differences between PPPs and traditional procurements

	Public Private Partnerships	**Traditional Procurement**
Contracting	• The different tasks related to a public utility (e.g. building, operating, etc.) are bundled. That may vary according to the PPP schemes.	• Each task is contracted separately.
	• Contracts generally run on the long term (20-50 years).	• Contracts run on shorter term.
Risk-sharing	• The risks related to the project are shared between the public and the private partner. Each one involves its one risk sharing, depending on the kind of project. To be optimal, each risk should be borne by the partner best able to manage it.	• The risks are more borne by the public sector, although the private may also have to bear a part (for instance the construction risk).
Financing	• A part more or less important of the financing comes from a private investor.	• Public sector finances the project.
Ownership	• The private consortium may own the asset until the end of the contract.	• The government keep the ownership of the asset.
Legal framework	• There is not country with a complete law concerning PPPs. Some adaptations have been made, which depends on the legal structure and the role of PPP and can strongly vary across countries.	• In most cases, the procedure is detailed in the public markets law.

1.2 Advantages and Limits of PPPs

The literature on public-private partnerships is broad and offers different points of view regarding the advantages of such a way to provide public utilities.[7] Some of them are widely accepted, while others lend themselves to debate and are subject to more complex studies. In this paper, it is proper to discuss about the efficiency of PPPs, because in Switzerland an important condition for the development is the popular support.[8] Therefore, the first step is to highlight their gain of efficiency in comparison to more traditional public provisions.

In this section, I will focus on three interlinked aspects concerning this efficiency, namely the tasks bundling, the risk sharing and the financing of such projects. As the interest taken in PPPs is relatively new, it is important to keep in mind that these advantages are merely of theoretical nature. The second chapter of this paper gives an empirical overview concerning PPPs in Europe and shows that the international experience with PPPs seems to be successful. However, there is not a general agreement concerning this issue among searchers, some of them being more pessimistic that others concerning the real efficiency of PPPs.

1.2.1 Bundling the Tasks

As mentioned in the section 1.1, a main difference between PPP and traditional public procurement is that, in the case of a PPP, the different stages of the building and the operation of a public infrastructure are bundled. The ensuing main benefits and the limits of this bundle will be analysed as follows.

As shown by Dewatripont and Legros (2005, pp. 124-128), Hart (2003) and Välilä (2005, pp. 106-107), bundling the building and the operating/maintaining phases of public facilities can lead to life-cycle cost savings. Indeed, according to the authors, the private partner, who is responsible for building a certain infrastructure, has more incentives to provide a better quality when she also has to manage the maintenance of this infrastructure, in order to reduce the costs. For

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[7] For a list of PPPs pros and cons, see PricewaterhouseCoopers (2005, pp. 17-26).
[8] This cause of the lag in Switzerland is one among others. In the second chapter, this subject will be discussed further.

instance, Dewatripont and Legros take the example of a bridge building and stress that a private firm will be more concerned by the solidity of it, knowing that it would have to pay higher costs in case of *ex-post* problems. Thus, « unless the party responsible for building is induced to internalise possible externalities on the operating phase of the infrastructure, inefficiencies may arise » (Dewatripont and Legros, 2005, p. 124).

Furthermore, crediting the different phases to a unique firm (or consortium) also has the advantage to avoid losses of skills between those phases. A well-accepted advantage of PPPs is that the private sector often performs better in managing the production and in operating a service than the public one does, leading to an increased efficiency. However, if the different stages will be managed by several and not necessarily connected firms, the possibility of differences of point of view concerning the best way to realize it increases.

Nevertheless, we cannot thus argue that PPPs are in any case better than traditional public procurement because of bundling. Indeed, Hart (2003, p. 74; see box 1.1) shows that conventional provision appears to lead to less underinvestment than PPPs when « the quality of the building can be well specified, whereas the quality of the service can't be », and vice versa. Then, the choice between one way or another depends on « whether it is easier to write contracts on service provision than on building provision. » Sceptical about the efficiency of what Quiggin (2004) calls the « first generation » approaches to private investment in public facilities, namely the PFI in UK and the first PPPs project in Australia, he argues that there is no reason to think that bundling will lead to an optimal allocation of risks in most cases, mainly because of a loss of transparency. [9]

Box 1.1 The model of Hart (2003)

In his article, Hart uses an HSV-type model to understand the benefits and the costs of PPPs.[10] The model is based on a PPP, in which facility construction and service provision are bundled, compared with a conventional provision. The

[9] According to Quiggin, bundling is preferable only when « construction involves an innovative special-purpose design » (Quiggin, 2004, p. 58).

builder can make two kind of investment, namely a productive investment i, and an unproductive investment e, which reduces total costs and quality. Thus, the costs from running the asset C and the benefit to society B are written as follow:

$$B = B_0 + \beta(i) - b(e) \quad (1)$$

$$C = C_0 - \gamma(i) - c(e) \quad (2)$$

Considering the second-best, where investments are nonverifiable and cannot be contracted on, Hart compares two cases. First, when contracts of building and operating are separated and assuming a competitive supply of contractors, the builder chooses i and e to solve:

$$\text{Max}\left(P_0 - i - e\right) \quad (3)$$

where P_0 is the price of the asset. The builder's equilibrium choices are $\hat{\imath} = \hat{e} = 0$, which means that she chooses the cheapest asset. Indeed, the builder does not internalise the externality (e.g. i, e affect the operating contract price). Second, when the tasks are bundled, the builder internalises the cost of service provision. Therefore, she chooses i and e to solve:

$$\text{Max}\left(P - C_0 + \gamma(i) + c(e) - i - e\right) \quad (4)$$

The first-order conditions are $\gamma'(\hat{\hat{i}}) = 1$ and $c'(\hat{e}) = 1$, which means that both investments are made.

Hart identifies the trade-off between bundling and unbundling. Under bundling, the builder does more of the productive investment but also more of the unproductive one, whereas under unbundling, she does not enough of the productive investment but the right amount of the unproductive one. Consequently, Hart argues that conventional provision is better when the contractor can specify the quality of the building better than the quality of the service. In contrast, PPP seem to be more effective when the quality of the service can be well specified in the contract, whereas the quality of the building task cannot be.

Source: Hart (2003).

[10] The HSV-type model is used by Hart *et al.* (1997) to disclose the cost and benefit of contracting out, in a more general debate concerning the choice between in-house provision and contracting out. For more information, refer to the paper.

Bennett and Iossa (2008) find in their model that whether the operating and the building stages should be bundled (in the case of PFI) depends on the importance of the externality and the effects of innovations in building and providing the service. It is not worth it here to enter more precisely in the models named above, but one should notice that the efficiency of bundling does not exist in every case. Thus, at times, traditional provisions must be preferred to PPPs, and each single case has to be studied, in order to figure out if bundling the phases of a public facility will lead to a situation with higher costs and inefficiencies or not.

Moreover, it is necessary to mention that when the economists are still discussing about whether a PPP is efficient or not, while it is generally accepted that bundling involves a certain number of disadvantages. Indeed, according to Iossa and Martimort (2008, p. 20), first « PPP projects are characterized by a longer procurement process and by higher costs of bidding than traditional procurement. […] Second, bundling of different phases of the project increases project complexity and limits participation of small construction firm. » These arguments must also be taken into consideration when the decision to resort to a PPP has to be taken.

As mentioned above, most of arguments presented here come from theoretic models. Thus, it is worth it to mention that a first study has been set up by Hoppe *et al.* (2011) in the field of experimental economics (see box 1.2). Following the insight of Hart, the authors first compare the cases of PPP and traditional procurement and second different kinds of subcontracting in PPP. They find strong evidences proving the trade-off highlighted by Hart. Particularly, according to the experiment, they show that PPP involves higher productive and unproductive investment than traditional procurement. Thus, that enhances the insight that PPPs must be carefully studied before being set up, because, depending on the kind of facility, the unproductive investments cannot be desirable (see boxes 1.1 and 1.2).

Box 1.2 The first experimental study comparing PPPs and TP

According to Hoppe *et al.* (2011), their study is the first experimental contribution to the comparison between PPPs and TP. It is based on the theoretical framework of Hart (2003, see box 1.1). The authors analyse the

behaviour of private and public partners regarding two kinds of investment (namely $i \in \{i_l, i_h\}$, which increases the service quality, and $e \in \{e_l, e_h\}$, which decreases the quality, when both of them reduce the operation costs). In the first part, Hoppe *et al.* analyse the results of a PPP, in which the building and operating tasks are bundled, and a TP, in which they are separately contracted. They make the following proposition:

$$i^{TP} = i_l < i^{PPP} = i^{FB} = i_h \quad (1)$$

$$e^{TP} = e^{FB} = e_l < e^{PPP} = e_h \quad (2)$$

where $i^{TP(PPP)}$ et $e^{TP(PPP)}$ are the levels of i et e under TP (PPP), i_h (e_h) the highest levels of i (e), i_l (e_l) the lowest levels and i^{FB} (e^{FB}) the optimal level of investment in the first-best world. For this part, 176 subjects are participating. Concerning the PPP treatment, 2 sessions of 20 rounds have been set up, in which 8 groups of 4 players (one principal, e.g. the public partner, and 3 private contractors) play 3 stages: (i) privates submit offer; (ii) principal selects an offer and (iii) private chooses i and e. For the TP treatment, 4 sessions are conducted, with 4 groups of 7 players each (one principal, 3 builders and 3 operators). The experiment runs on 5 stages: (i) builders make offers; (ii) principal selects one of them; (iii) builder selected chooses i and e; (iv) operators make offers and (v) principal selects an operator. Under standard contract-theoretic assumptions, Hoppe *et al.* make the following predictions:

1 In PPP treatment, i_h and e_h will be chosen more often than in TP treatment.

2 Principal's payoff (e.g. $B(i,e) - P_0$) will be larger in PPP than in TP.

The results of the experiment are close to the theoretic prevision, especially during the last round. The authors find strong evidences on prediction 1 et 2, which means that competition seems to work and PPP is the welfare-maximizing governance structure. Indeed, the total surpluses in PPP are (in ECU) 39.95 on average and 40.25 in the final round, against 33.71 and 25.25 in TP treatment, when the theory predicted 40 for PPP and 25 for TP.

In the second part, a more realistic case is studied, in which the consortium is not a monolithic entity, but involved subcontracting of either the operating

task (Sub I) or the building task (Sub II). The theoretic proposition is made as follow:

$$i^{II} = i_l < i^I = i^{FB} = i_h \quad (3)$$

$$e^{II} = e^{FB} = e_l < e^I = e_h \quad (4)$$

where i^I, i^{II}, e^I and e^{II} are the investment level in Sub I and II. The following predictions are made:

3 i_h and e_h are chosen more often in Sub I than in Sub II.

4 Principal's payoff is larger in Sub I than in Sub II.

By the same method as previously, the authors point out that predictions 3 and 4 are corroborated. The total surpluses are 38.16 on average and 38 for the final round for Sub I (in theory: 40), against 29.11 and 24 for Sub II (in theory: 24). The conclusion of this study is that the trade-off of Hart finds strong evidences. i and e are much more often made in PPP, and in the last round almost all investment decisions were predicted. Moreover, in the final round PPP and Sub I do not differ, as well as TP and Sub II.

Source: Hoppe et al. (2011).

1.2.2 The Risk Sharing

It is often argued that PPPs are an efficient way to provide public utilities because each risk is borne by the partner best able to manage it (see for instance Bingisser *et al.*, 2005, pp. 21-22 and PricewaterhouseCoopers, 2005, p. 20). However, it is not an easy task to define precisely how the risk must be shared, especially because a PPP normally runs on the long term and the contracts must be often renegotiated. Furthermore, this long contract period increases the uncertainty and the risk, enhancing the importance of an optimal share of the risks related to the project. It is worth it to show here how this risk sharing can be efficient, and what should be taken into account when building a contract.

Broadly speaking, one can find two main sources of efficiency from the risk sharing. First, according to Välilä (2005, pp. 106-108), a reason why PPPs can lead to higher productive efficiency than traditional public provision is that the risks are assigned (or should be assigned) to the partner that can best manage it. In

other words, each risk must be assigned to the partner which can either fully controlled it or borne it at the lowest cost (Debande, 2002, p. 368). For instance, it is obvious that the public partner is best able to deal with the political or legal risk, whereas the private firm has more skills to manage any risk related to the asset in itself, namely the risks happening during the development, the construction and the operation phases.[11] The following example of the public opposition to the M6 Tollway illustrates how the political risk can be borne by the public sector:

> The M6 Tollway is a PPP motorway in UK known as Birmingham Northern Relief Road. The project was delayed eight years because of a strong public opposition, mainly due to the introduction of direct user tolls and the surrounding community scared by the noise. The opposition, namely the well-organised Alliance against the BNRR or AABNRR group, used legal procedures included High Court Challenges. Thus, an agreement had to be negotiated in order to reduce the environmental impact. Moreover, because of the delay, a number of road design standards changed in between. As this changes were generated by the Highways Agency, the project sponsor (e.g. the public agency) hold the risk related to changes in design standards. Indeed, as the private concession team was not responsible for that delay, there were no justifiable reasons for it to the bear that risk.
>
> *Source: AECOM Consult, Inc. (2007, pp. 3.7-3.11).*

The second reason is related to the incentives occurring when the private partner bears the risk. For instance, when a consortium of firms, e.g. the private partner, knows that it will have to assume the consequences related to a precise risk, it has more incentives to better manage the infrastructure and to minimise the impact that the risk could have on the project. Thus, the importance of identifying the risk as well as the party best able to manage it efficiently must be stressed here. When choosing between a PPP and a more traditional provision, the public sector should be able to measure the risks associated.

A specific attention should be taken to the demand risk. Indeed, « a critical aspect of any PPP contract is the allocation of demand risk between the public authority and the private provider » (Athias, 2009, p. 3). According to Välilä

[11] For a detailed analysis about each risk, see Debande (2002) and Quigging (2004).

(2005, p. 107), on the hand, one can argue that the demand risk should be assumed by the public sector because the « demand is relatively more influenced by factor under the public sector's control, such as general economic policies or sector-specific policy measures. […] On the other hand, it can also be argued that the private sector partner should carry the demand risk, as it is the ultimate way to ensure that the private partner has the right incentives to act in the principal's interest and promote efficiency. » As mentioned in section 1.1, there are different payment mechanisms that involve a different kind of demand risk sharing. Iossa and Martimort (2008, p. 22) build a model in order to find out which mechanism is the best, regarding to the incentive constraint, and under which conditions it takes effect. Their results show that user charges are more likely to be optimal when risk-aversion and demand risk are small, whereas availability contracts seem to be better when risk-aversion and demand uncertainty are high (see box 1.3).

Athias (2009) offers an interesting approach of the relationship between the type of contract and the public responsiveness to consumers' concerns. The author proves that, from this point of view, « the contract form in which the private provider bears the demand risk always dominates the one in which it does not bear the demand risk ». However, according to the assumptions of the model, she also shows that the availability contract (i.e. when the private partner does not bear the risk) is best able to induce incentives for the private provider in order to reduce costs.

To conclude, one notices that risk sharing is a crucial point of PPP contract. Nevertheless, the literature on the topic does not show a unique way to make it optimal and several arguments can be found, whether each different risk should be borne by the public sector or by the private provider. Whereas some of these risks can be easily identified and measured, others are more difficult to distinguish and need technical and precise analyses. Thus, in practice, every project must be studied separately, because each one has a particular risk design. Moreover, if a part of the risk is transferred to the private partner, the risk premium will increase for the public sector. The costs related must also be taken into account.

Box 1.3 Optimal demand risk allocation: Iossa and Martimort's model

Iossa and Martimort (2008, pp. 20-22) study the factors affecting the optimal allocation of demand risk under two possibilities of payment, either based only on user fees or based on availability. Assuming a consumers inelastic demand up to some price level p_0 written as follow:

$$D(p) = \begin{cases} d_0 + a + \eta & \text{if } p \leq p_0 \\ 0 & \text{if } p > p_0 \end{cases} \quad (1)$$

where the random variable $\eta \sim \mathrm{N}(0,\sigma^2)$ and a is a demand-enhancing effort, the expected revenue of the firm, which can extract all the consumer's surplus is:

$$E_\eta(R) = p_0 E_\eta\left(\max\left\{d_0 + a + \eta, 0\right\}\right) \approx p_0\left(d_0 + a\right) \quad (2)$$

when σ^2 is small enough.

Assuming away any incentive issue on the cost side and a marginal cost of providing the services null, the payment mechanism follows the scheme $t(R) = \alpha + \beta R$, where α is a fixed payment paid to the firm and β the share of the revenues generated that the firm receives. Thus, the payment based only on user fees occurs when $\alpha = 0$ and $\beta = 1$ and the payment based on availability when $\alpha > 0$ and $\beta = 0$. Moreover, the contractors seek to maximize their expected utility and their incentive constraint is defined as follow:

$$a = \arg\max_{\tilde{a}} \alpha + \beta p_0\left(d_0 + \tilde{a}\right) - \frac{\tilde{a}^2}{2} - \frac{r\sigma^2\beta^2 p_0^2}{2} = \beta p_0 \quad (3)$$

where $\tilde{a}^2 / 2$ is the disutility of the demand-enhancing effort (counted in monetary terms) and $\left(r\sigma^2\beta^2 p_0^2\right)/2$ the risk-premium. Giving the fact that the government can extract all profit from the firm, it faces the following problem:

$$\max_a p_0\left(d_0 + a\right) - \frac{\left(1 + r\sigma^2\right)}{2} a^2 \quad (4)$$

Then, the optimization of (4) gives the second-best value of a:

$$a^{SB} = \frac{p_0}{1 + r\sigma^2} \quad (5)$$

and the government designs the contract with the following parameters:

$$\beta^{SB} = \frac{1}{1+r\sigma^2} \text{ and } \alpha^{SB} = -\beta^{SB} p_0 d_o + \frac{\left(r\sigma^2 - 1\right)\left(\beta^{SB} p_0\right)^2}{2} \quad (6)$$

From (3) and (6), one can deduce the following result: when the risk-aversion r and the risk demand are high, $\beta \to 0$ and $\alpha > 0$, which means that the payment should be based on an availability system. In contrary, when the risk-aversion is low, as well as the demand risk, $\beta \to 1$ and $\alpha \to 0$, which involves user fees based payment system.

Furthermore, adding a parameter λ, which affects the impact of a on demand in such a way that $D(p) = d_0 + \lambda a + \eta$, shows a positive relationship between β^{SB}, α^{SB} and λ. Iossa and Martimort conclude that the demand risk must be borne by the government when the private firm does not have the possibility to affect demand levels ($\lambda \to 0 \Rightarrow \beta \to 0$).

Source: Iossa and Martimort (2008, pp. 20-22; 54).

1.2.3 The Financing Argument

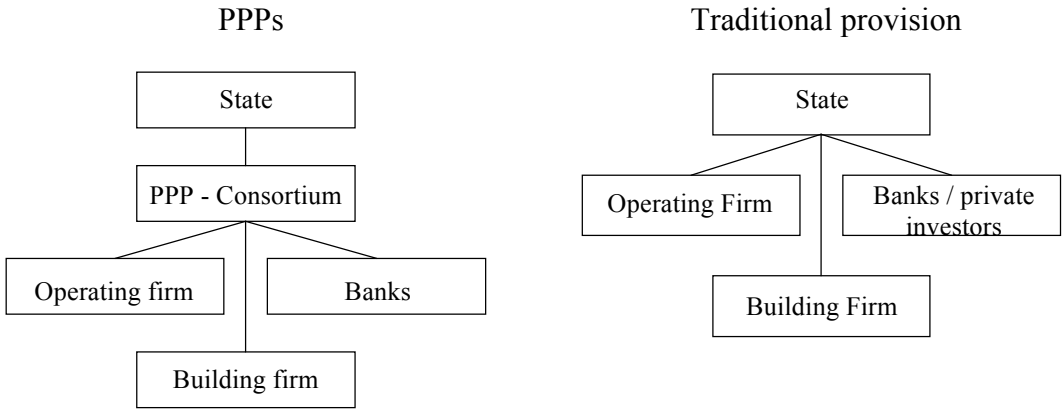
As mentioned in the section 1.1, the financing of projects is also a key point of PPPs. Indeed, it is often argued that PPPs are a good way to alleviate the budget of the state because a part more or less important of founds comes from the private sector.[12] This is important for Switzerland, because another reason of the relative lag concerning PPPs is that, until now, the finances of the public authorities were good enough to afford huge infrastructure projects and the question of turning to private financing was not essential (Bissinger *et al.*, 2005).

A main difference between PPPs and in-house provision is that, in the case of PPPs, a part of the financing can come from the private partner, who borrows or is a private investor. That gives the opportunity for a country with a strength budget constraint to set up important and costly projects, because it « will only account for the annual payments it makes to the PPP company, and not for the assets and

[12] In this respect, it is often mentioned that private funds are more expensive than public ones (in terms of interest rate). For the theses related to this issue, see PricewaterhouseCoopers (2005, pp. 30-32).

liabilities of the project, including its debt » (PricewaterhouseCoopers, 2005, p. 26). The mechanism is simply illustrated in the figure 1.2.

Figure 1.2 Financing of PPPs and traditional provision



Source: Akitoby et al. (2007, p. 10).

This possibility of realizing project *off the balance sheet* can be really attractive. However, the choice of whether or not contracting a PPP for a project should not rest on that financing argument.[13] Indeed, according to Iossa and Martimort (2008, p. 25), « the accounting treatment […] can often make the government budget look healthier than what it is, thereby undervaluing the cost of PPP financed infrastructure. » The consequence is not only that it biases the choice between PPPs and traditional procurement, but it also « can make PPPs a means to unduly transfer costs from current to future generations » (*op. cit.*, p. 25). Nevertheless, at the European level, the accounting rules about PPPs have been adapted in order to avoid such behaviour from governments. However, Iossa and Martimort estimate that « the temptation to adopt PPPs as a tool to window dress budget deficits has not been fully removed. » Thus, one can say that the decision to resort to a PPP or a more traditional procurement must be based on efficiency and cost comparisons, in order to avoid the biases mentioned above.

In this section, three of the main issues concerning PPPs have been discussed. The literature offers several different ways to approach them and

[13] A part of the literature is also devoted to the advantages of bundling the operating and the financing part. In this respect, Palmer (2001) is critical about such a bundling. For more information, see also Iossa and Martimort (2008, pp. 25-28).

conclusions differ too, depending on the authors. I have proven that the theoretical advantages contain dangers that must be taken into account by the public sector; otherwise they can lead to higher costs and inefficiencies. Thus, each project must be analysed separately in terms of risk sharing and costs. The importance of the contracts is crucial for the execution of a project, and their complexity involves the impossibility, up to now, to resort to a skeleton contract. Each contract must be carefully studied, which can lead to higher transaction costs and take more time than traditional procurement.

Chapter 2 Empirical Framework of PPPs: Development of the PPP Market in Europe and Empirical Evidence

In the previous chapter, the theoretical framework of PPP has been studied as well as their main characteristics relatively to traditional procurement and privatization. Furthermore, I showed the potential of PPPs in terms of efficiency. Thus, in the section 2.1, the development of PPPs will be analysed. Although PPPs are worldwide spread, the focus will be on Europe for two reasons. First, the real beginning of the use of PPPs occurred in the UK, with the so-called Private Finance Initiative (PFI). Second, the legal, institutional and economic frameworks of European countries are more similar to the Swiss setting. In the section 2.2, several empirical studies will be presented in order to illustrate the diverse statistical techniques used by searcher to assess the determinants of PPPs. Their main results will also be shown.

2.1 PPPs in Europe: Evolution Since 1990 and Distribution across Sectors

The first part of this section is based on the paper of Kappeler and Nemoz (2010).[1] To my knowledge, this is the most recent one that gives an overview about the evolution of number and financial value of PPPs in Europe since the 1990s. Nevertheless, one must be careful when referring to such studies because databases about PPPs are often incomplete and there are different ways of accounting them. Moreover, as PPPs do not have exactly the same meaning in different countries, there are several stumbling blocks in aggregating data of different countries. However, the study of Kappeler and Nemoz takes these points into consideration and gives a conductive overview about PPPs in Europe. They consider PPPs as any project running on the long term with a risk sharing between private and public partners based on agreement or concession, of which the capital value is higher than EUR 5 million and that reaches the financial close.[2]

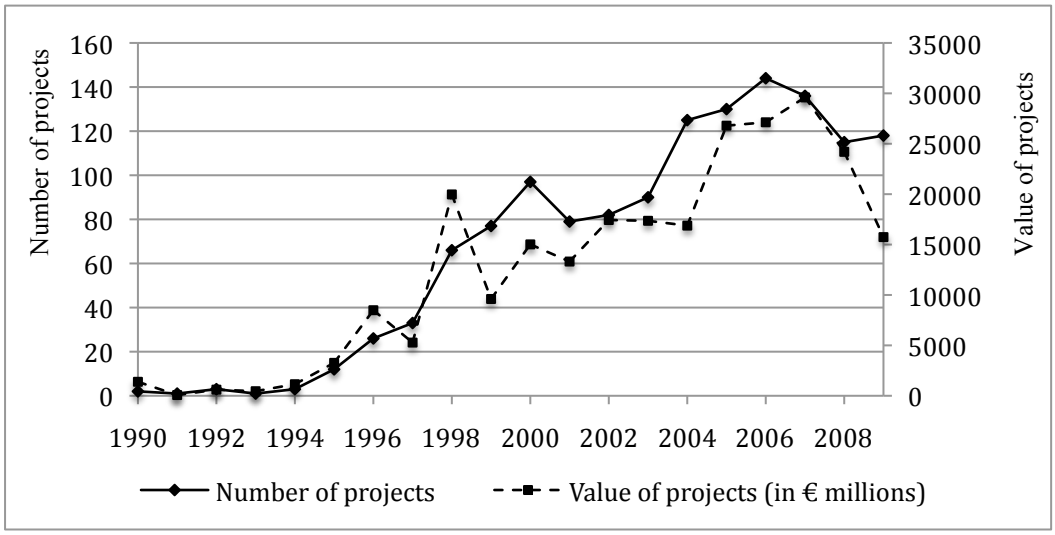
[1] The authors compile several data from European Investment Bank files, commercial databases and public sources (Dealogic Projectware, Infrastructure Journal, InfraNews, HM Treasury, Partnerships UK, Irish PPP Unit and EIB internal project database).

[2] The final close is « the date at which all project contract and financing documentation have been signed, and conditions precedent to initial drawing of the debt have been fulfilled. » (Kappeler and Nemoz, 2010, p. 5).

2.1.1 Development of the PPP Market in Europe from 1990 until Today

The resort to PPPs officially started in the 1990s, mainly in the UK with the so-called Private Finance Initiative (PFI), following the Ryrie Rules and more precisely the Autumn Statement of Norman Lamont (e.g. the Chancellor of the Exchequer between 1990 and 1993) in 1992.[3] About ten years later, continental European countries like France, Germany and Spain also started to develop real PPPs policy. As shown in the graph 2.1, the number of PPPs in Europe (including UK) steadily increased between 1995 and 2006, and then started to decrease, after reaching a peak of 144 PPPs reaching their financial close in 2006. During the full period, there were 1340 PPPs launched, for a total amount of more than €250 billion. One must notice that until 2004, the share of PPP projects reaching their financial close in the UK was higher than 75 percent and steadily decreased since then.

Graph 2.1 Number (left-hand axis) and value (in € million, right-hand axis) of PPPs projects launched in Europe, 1990-2009



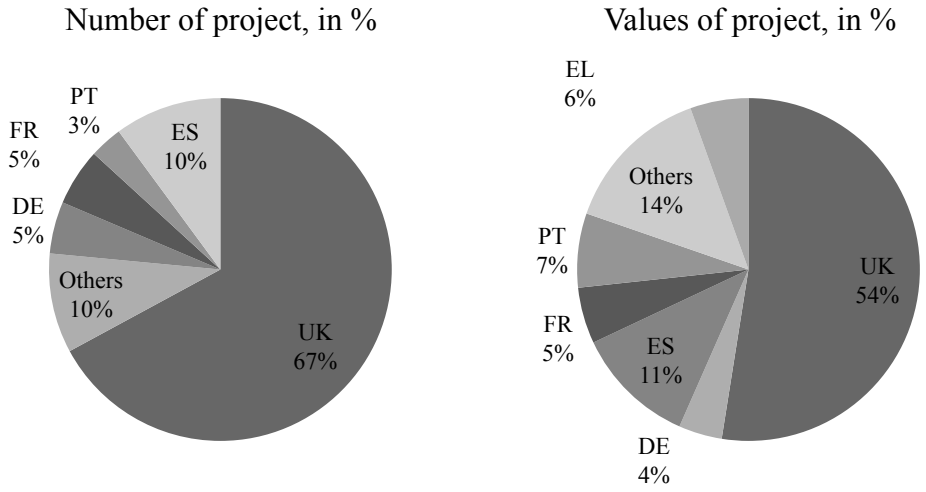
Source: Kappeler and Nemoz (2010, p. 7).

As shown in the graph 2.2, a third part of these projects belongs to the UK, followed by Spain with 10 percent. These two countries, together with France, Germany, Italy and Portugal, account 91 percent of the PPPs originated in Europe.

[3] Mor information about PFI contract form are given further. For detailed information, see Grahame (2003).

Concerning the total value, these countries and Greece account 86 percent of the total. However, the share of the UK declines since 2001, what « highlights […] the ongoing diversification of PPPs across countries » (Kappeler and Nemoz, 2010, p. 9). When *mature* markets (UK and Spain) have slowed down, in the *emerging* ones (France, Germany and Portugal), the number of projects has increased considerably recently.

Graph 2.2 Distribution of PPPs across EU, aggregation from 1990 to 2009



Source: Kappeler and Nemoz (2010, p. 8).

Nevertheless, according to EPEC (2011), the UK remains by far the most important market for PPPs in 2010, with 42 projects reaching the financial close in comparison to a total of 112 in Europe. In terms of value, the most important market is, however and for the first time Spain, followed by the UK, Portugal and France, despite a lower number of projects. Furthermore, this report shows an interesting fact, that is to say a so-called « geographic mix ». Indeed, one can see two different categories of countries. On the one hand, those like Germany, the UK and France, which are more likely to set up relatively small PPP projects, as the proportion of small deals is more common there. On the other hand, countries like Portugal, Sweden and Belgium, focusing almost exclusively on large PPP transactions. One should also notice that huge PPP projects might result from cooperation between countries, as illustrated in the following example:

> The Øresund Bridge and Tunnel is a huge infrastructure that links Denmark and Sweden, built between 1992 and 2000 and whose contract reached an amount of US$5.4 billion. It is considered as one of the first projects of that size in Europe delivered through a Design-Build system and was conceived as a "statement" about environmental protection, economic development and international relationship. The resort to a PPP was in this case really helpful. Indeed, in the one hand the governments of both Denmark and Sweden defined performance standards in terms of traffic and environment. On the other hand, the private sector was better able to face the multiple technical challenges through innovations, fabrication and mitigation approaches. However, the project suffers today from cost overruns and traffic volumes lower than expected. Thus, the self-financing approach (e.g. through user fees that were planned to cover the costs of the construction and operation over 30 years) is now in doubt. Under moderate assumptions, the period until which the facility will be repaid has been extended to 2046, instead of 2030.
>
> *Source: AECOM Consult, Inc. (2007, pp. 4.23-4.27).*

2.1.2 Distribution of PPPs in Europe across Sectors

It is interesting to go further into the study of PPPs development in Europe with a look to the main sectors concerned by PPP projects. The data of the UK and the rest of Europe is separated because of the differences in maturity and structure across PPP markets (Kappeler and Nemoz, 2010, p. 10).[4] The choice of sectors is based on the Classification of the Functions of Government defined by the United Nations. The sectors are the following:

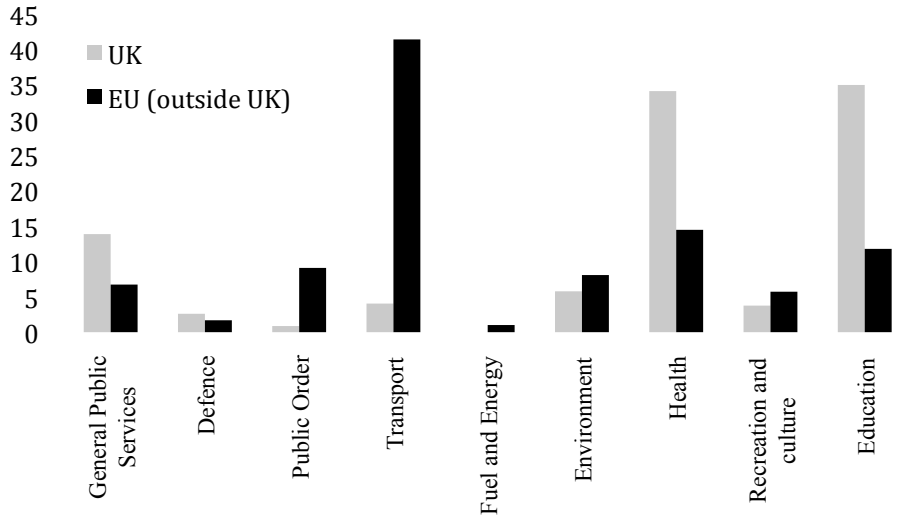
- *General Public Services* (administration, operation or support of general public services)
- *Defence*;
- *Public Order and safety* (police, fire-protection, etc.);
- *Transport*;
- *Fuel and Energy* (electricity, etc.);
- *Environment*;
- *Health*;
- *Recreation and Culture* (sport, cultural services, etc.);

[4] Thus, in this subsection, the reference to continental European countries means Europe outside the UK.

- *Education*.

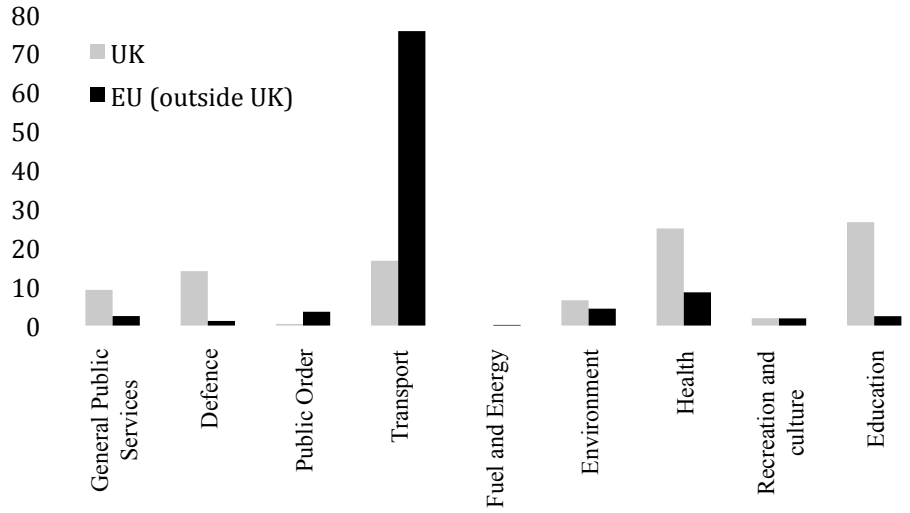
As shown in the graphs 2.3 and 2.4, *transport* remains by far the main sector concerned by PPPs in continental Europe, with 41 percent of the total number of projects and 75 percent of the total financial value, according to the average between 2005 and 2009. Furthermore, in terms of number of projects, *Health* (fourteen percent of the total) and *education* (twelve percent of the total) are becoming more and more important in continental Europe. Concerning the UK, the most important sector is *education*, which counts 35 percent of the total number of projects and 27 of the total financial value. It is closely followed by *health*, with 34 percent of the total number and 25 percent of the total financing value. The share of the *transport* sector decreased since the period 1995-1999 in the UK to reach an average of 4 percent of the total number of PPPs between 2005 and 2009 (Kapeller and Nemoz, 2010, p. 11). Nevertheless, the share of *transport* in the UK remains important in terms of value, with 16 percent of the total.

Graph 2.3 Number of PPPs project in the UK and in Europe (outside the UK) by sector between 2005 and 2009, average, in %



Source: Kappeler and Nemoz (2010).

Graph 2.4 Financial Values of PPPs project in the UK and in Europe (outside the UK) by sector between 2005 and 2009, average, in %



Source: Kappeler and Nemoz (2010).

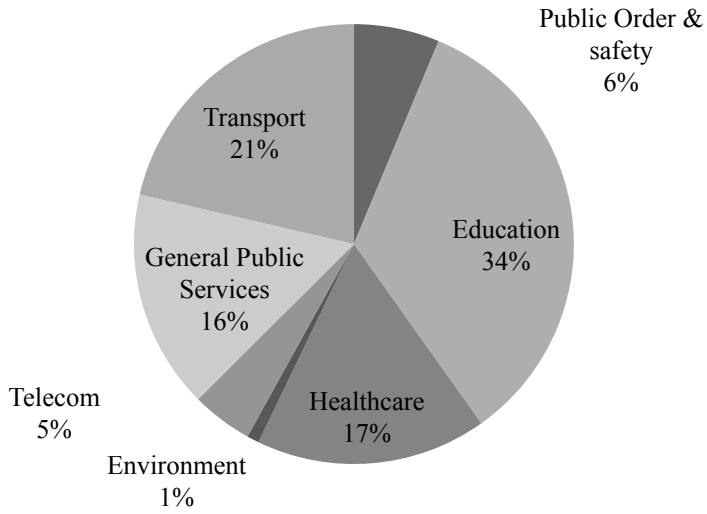
The difference between the mature markets and the emerging ones is the fact that the *transport* sector decreased in the UK and represents a smaller share of PPPs both in terms of number and financial value than in continental Europe, while *health* and *education* are the main sectors in the UK. This insight leads to the following hypothesis. As PFIs policy in the UK started mainly with highways, it seems logical that the importance of the *transport* sector decreased over time, because huge projects have been started already years ago and cannot be endlessly renewed. Thus, one can conclude a trend of PPPs to be first implemented in *transport*, and then to other sectors like *education*, *health* and *general public services*.

As shown in the graph 2.5 concerning the year 2010, the main sector affected by PPP projects in Europe (including the UK) was *education* (34 percent of the total number of project), followed by *transport* (21 percent) and *healthcare* (17 percent). Therefore, *education* and *healthcare* accounted together for more than 50 percent of the total number of deals (EPEC, 2011, p. 5). However, in terms of value the *transport* sector remains the largest (40 percent), followed by *education* and *healthcare*. Nevertheless, for the first time since data are collected

by EPEC, namely since 2002, « non-transport sectors represented more than half of the PPP market value » (EPEC, 2011, p. 5).

Finally, another interesting item described by Kappeler and Nemoz must be shown here. It is namely the distribution of PPP projects within the category *transport* in Europe (outside the UK). Indeed, the authors show that the sub-sector *road* is by far the most concerned, with 68 percent of the total number of projects and 78 percent of their total value. The second sub-sector is *urban railway*, which accounts to 12 percent of the total number and 7 percent of the total value. The other 20 percent of the total number of PPP projects in *transport* are shared between *water transport* (6.5 percent), *rail* (five percent), *tunnel* (five percent), *airport* (2.5 percent) and *bridge* (less than one percent). As noticed by Kappeler and Nemoz (2010, p. 13), since 1995 the part of *urban railway* increased over time, whereas these of tunnels, bridges and airports decreased.

Graph 2.5 Number of PPP deals by sector in 2010 in Europe (including the UK)



Source: http://www.eib.org/epec (consulted the 2011-04-20).

2.1.3 Assessment of the Efficiency of PFIs Projects in the UK

In the preview subsections, the main characteristics of the PPP's market in Europe have been shown. It is now worth considering how these projects reached the expected goals set up by governments and whether the desired efficiency has been reached. However, due to a lack of reports and available data, an overview of the general European situation would require more time. Therefore, I will focus on

the UK. Indeed, there, the PPP's market is mature enough to be significant and the National Audit Office (NAO) offers several qualified reports. First, the situation of the PFI Construction projects will be studied, as it gives a good analysis of the performance in the building phase. Second, the operating phase will be studied, within the example of the PFI-hospitals market. Beforehand, more details about PFI contract forms are given hereafter.

It must be first mentioned that there is not a single form of PFI contract, as it concerns a broad variety of sectors and each of them involve different kind of risks and priorities. However, according to Rowlinson (2005), PFI schemes can be describe as follow. There is a single contract between the public agency responsible for the facilities concerned by the contract (e.g. health care agency, etc.) and a company, referred as Project Co, who is usually created for this purpose and provides the finance, design, construction and maintenance of the asset. This Project Co company enters in most cases into three contracts, i.e. for (1) financing the project, (2) designing and building the asset and (3) maintaining it. In the contracts (2) and (3), many sub-contractors and suppliers can be involved, which can raise the PFI scheme to a high degree of complexity.

2.1.3.1 Performance of PFI Construction in the UK

The report of the National Audit Office (2009), *Performance of PFI Construction*, offers insights concerning the efficiency of PFI in the construction sector. Within a sample of 114 projects, of which 51 are schools and 34 are hospitals, the authors analyse the time delivery, the costs and the satisfaction of users. However, they neither assess PFIs' value-for-money in a whole nor seek any comparison with construction performances of other form of procurements.[5] The main results of the study will thus be discussed here.

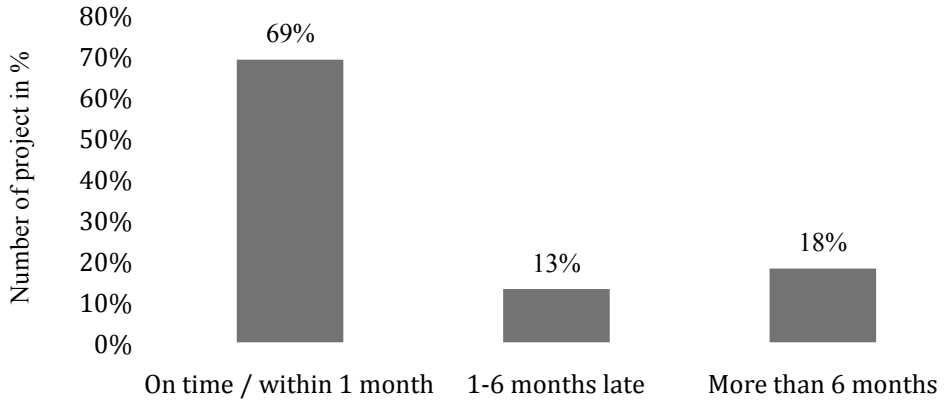
First, as illustrated in the graph 2.6, more than two third of the projects included in the survey, i.e. 69 percent, were delivered on time, whereas 13 percent were delivered between one and six months late, and 18 percent more than six months (the latest one was delivered thirty-six months late).[6] The study of NAO

[5] For more information about papers studying value-for-money of PPPs, see box 2.1.
[6] At the time of publishing the report, two projects had not been yet completed, due to planning permission issues. However, these issues are not specific to PFI contracts.

also collected non-PFI projects from different databases.[7] Due to differences in project sizes and sectoral mix, these data are not directly comparable to PFI projects. However, one can mention that 63 percent of the non-PFI projects taken into account were delivered on time, which is quite close to the results obtained with PFI contracts.

According to the survey of the NAO, the managers of the projects delivered on time noticed the following factors as beneficial to a project conclusion on schedule: quality of private and public sector management, clear understanding of the project, clear output specifications, deferment of the unitary charge until the projects are completed, i.e. financial penalties in case of delays, and good forward planning in the procurement phase. One can see that PFI contracts, and more generally PPP contracts, are likely to encourage such factors as they demand an intensive collaboration between the private partner and the public sector. Moreover, each sector is not concerned by late delivery in a similar way, due to different time constraints. Indeed, the education sector is generally less subject to this problem, as schools must be opened at the beginning of the scholar year and any delay can be tolerated.

Graph 2.6 Time delivery of PFI projects in the UK in the 2008 survey



Source: National Audit Office (2009, p. 11).

[7] The data of non-PFI construction projects come from NAO own surveys, Construction Excellence's KPI Zone data, OGC's Achieving Excellence data and Audi Scotland's Major Capital Projects data. However, the NAO mentions several difficulties in collecting data, therefore the results must be used with caution.

Concerning the reason of delays, one mentions private sector project management issues in 42 percent of the cases, financial difficulties (fifteen percent), issues where the public sector retained the risk (twelve percent) and several other minor problems (National Audit Office, 2009, p. 15). To conclude about time delivery, the PFIs projects are mainly satisfactory, although a certain number of difficulties remain, which cannot be avoided completely.

Further, the NAO also evaluated the delivery of PFI construction to the originally contracted price.[8] An average of 65 percent of the surveyed projects was delivered to the original settlement, whereas 29 percent were less than 5 percent over the contracted price. Moreover, in 25 percent of the cases, price increases resulted to public sector or third party initiated changes. Therefore, only 10 percent of costs overrun came from the private sector. In contrast and still with all the necessary caution related to non-PFI constructions data, the NAO notices that, in the case of non-PFI contracts, an average of 54 percent (ranging between 42 and 66 percent) have been delivered to contracted price. Nevertheless, arguing that PFIs are best able to provide assets to originally contracted price cannot be made on the basis of this study, due to the statistical issues mentioned above.

The mentioned reasons explaining the appropriate price delivery of PFI construction projects are mostly the « fixed price » nature of the PFI contract, the incentives (or penalties) included in the contract, clear output specifications, good planning of the building task during the procurement phase and the quality of public sector project management (National Audit Office, 2009, p. 20). As with the time delivery cases, one must notice here that the nature of PFI contracts (more generally PPP) involves many elements, which promote the respect of originally contracted prices.

Furthermore, the NAO found out a weak correlation between the time delays and the price overruns. Indeed, only 35 percent of the projects delayed by more than six months were subject to prices increases, whereas 57 percent of the projects experiencing delays were completed to the originally contracted price. According to the NAO, this result shows that the risk transfer seems to work.

[8] The proportions given are averages because they concern a sample of projects, due to the fact that not all of the questioned projects managers were able to give information. Therefore, one must not take them as fully precise values.

Indeed, « in the cases where delay has only been as a result of those risks retained by the private sector, the public sector has not seen the price of their project increase, as a result of the delay » (National Audit Office, 2009, p. 20). In other words, it suggests that an optimal risk sharing implies that the public sector does not suffer from any consequences (in terms of time delivery and/or price) due to risks borne by the private sector.

2.1.3.2 Performance of PFI Hospital Contracts in the UK

The preceding paragraphs concerned mainly the building phase of PFI contracts. Turning now to the analysis of PFI hospital contracts, I will show the results in terms of efficiency of the operating phase. This section is based on the report of the NAO, *the Performance and Management of Hospital PFI Contracts* (National Audit Office, 2010), concerning 76 PFI hospital projects operational by April 2009 and analysed in the course of three periods (2005-06, 2006-07 and 2007-08).[9] Particularly, the maintenance services and the so-called 'hotel services' are studied, namely services as cleaning, catering, portering and laundry.

Different types of Trusts generally manage these PFI hospitals. Therefore, the NAO looked at their satisfaction concerning hotel services to estimate the level of value-for-money, as well as at the so-called Performance Management Systems. These systems are used by the Trusts to monitor the activities of the private contractors within performance indicators, which are negotiated during the bidding process and thus can significantly vary between contracts. When the expected performances are not reached, Trusts can charge financial deductions to the payment they make to the operators.

Concerning the satisfaction of Trust about hotel services, the National Audit Office (2010, pp. 16-21) reports that « 67 percent of Trusts rated all services as at least satisfactory [… and] 15 percent rated all their services as better than satisfactory. » Moreover, a majority of Trusts said that the quality of services either stayed the same or improved. Nevertheless, 33 percent estimated at least one service as unsatisfactory, which means that, despite a high level of satisfaction, there is still a range of possible improvements.

[9] The detailed methodology used by NAO for this study can be found on the website: http://www.nao.org.uk/ publications/1011/pfi_hospital_contracts.aspx.

Concerning the Performance Management Systems, the survey of the NAO shows that, for the period 2008-2009, 53 percent of the Trusts did not charge any deductions in all services, whereas 27 percent charged some in maintenance services and 21 percent in hotel services. However, these deductions represented only a low percentage of the unitary charge, namely between 0.01 and 5.18 percent.

According to the National Audit Office (2010, p. 8), such low deductions and high satisfaction levels indicate that most of PFI hospital contracts achieve the expected value-for-money. Indeed, Trusts seem globally satisfied with the services delivered by the contractors. However, as shown in the table 2.1, the resort to PFI contracts schemes does not lead to significant cost savings in comparison to other forms of procurement.

Table 2.1 Costs per hotel services in PFI and Non-PFI hospitals in the UK, in £

Period	2005-2006		2006-2007		2007-2008	
Type of contract	PFI	Non-PFI	PFI	Non-PFI	PFI	Non-PFI
Maintenance (cost per m^2)	*24.32* [a]	*20.53* [a]	22.82	21.74	*27.53* [a]	*23.53* [a]
Cleaning (cost per m^2)	28.55	31.24	32.98	28.76	33.05	35.86
Catering (cost of feeding a patient per day)	6.44	6.71	6.49	7.39	*6.27* [a]	*7.39* [a]
Laundry (cost per item laundered)	0.41	0.45	0.43	0.41	0.44	0.45
Portering (cost per occupied bed)	1678	1735	2196	1973	2037	2168

Notes
[a] Differences statistically significant

Source: National Audit Office (2010, p. 25).

Indeed, the table 2.1 shows the costs of the five most important services in PFI hospitals and non-PFI hospitals. Prior it should be mentioned that the costs are averages and therefore can include high variations within the categories themselves. Indeed, according to the NAO survey, the costs of feeding a patient vary for instance from £3.16 to £12. However, the distribution of data does not

give any reason to believe that there are any biases in favour or against PFI. Thus the following conclusion can be made.

Except the maintenance cost for the periods 2005-2006 and 2006-2007 and the catering cost for the period 2007-2008, there are no statistically significant differences between the PFI hospital and the non-PFI ones. There are effectively differences in the costs of cleaning, laundry and portering, but they remain relatively small related to the range of costs. Thus, one must not conclude that PFI contracts are neither better nor worse able than non-PFI contracts for providing value-for-money in these fields. As shown in the graph 2.1, only the maintenance costs are statistically significantly higher in PFI hospitals. This may result from the fact that PFI contracts involve high standards and « commit the Trusts to pay for maintenance over the life of the contract, [whereas] in conventionally procured hospitals, [they] have the ability to determine expenditure on maintenance, providing greater flexibility » (National Audit Office, 2010, p. 23).

To conclude this subsection, it should be stressed that there are different issues concerning the efficiency of PFI contracts. Indeed, in the construction area as in the operating phase of hospital, PFI seems to be mostly satisfactory. Projects are, most of time, delivered on time and on price, or with small overruns. Moreover, services do not globally cost more than other forms of procurements. Nevertheless, it remains quite difficult to compare the performance of PFI contracts, or more generally PPP, with other forms of public procurement. The reports presented above were both not able to show cases in which PFI would be better that traditional procurement in terms of value-for-money and efficiency.

These results agree with the theoretical framework studied in the chapter 1. Indeed, it has been shown that PPPs are not more efficient than TP *per se* and several conditions must be fulfilled to provide the expected results. In term of value-for-money, the different studies conducted until today are far to reach a common conclusion. Hodge and Greve (2009) show that some authors found higher value-for-money in the case of PPP, whereas others reached totally opposite results. More information on the article of Hodge and Greve are given in the following box 2.1. It must beforehand be mentioned that this paper does not give any information about analysis methods used in order to asses value-for-

money of PPP. It shows the different results obtained by these studies without entering into technical details. Therefore, an overview about several empirical works and their main issues and methods will be given in the next section.

Box 2.1 Overview of PPPs value-for-money studies by Hodge and Greve

Hodge and Greve (2009) made a survey of several evaluations of PPPs set up since 1998. Within the different objectives related to PPPs, the authors focus on the better value-for-money argument. They summarise a range of evaluations based on international experiences of long-term infrastructure contract (LTIC)-type PPPs. Four elements can be pointed out:

First, the statistical robustness is weak and controversial. Therefore, the results of these studies must be considered with caution. Second, the 'traditional procurement' to which PPPs are compared is a vague term and mainly unquantified. Third, almost all studies are made in an early stage in the project life, or even only before the signing of contracts.

Fourth, the results of the studies included in the survey of Hedge and Greve vary a lot. Indeed, according to several authors, on the one hand, cost saving between 10 and 20 percent occurs within PPPs, as well as more efficiency than TP, resulting to a better VfM. On the other hand, some studies show that LTIC-PPPs have sometimes been wasteful and resulted in a lower VfM than announced. Between these two extremes, one finds studies concluding that PPPs' value-for-money depends on each case and thus a trend cannot be confirmed.

To conclude, according to the authors, « the evidence to date […] has an unclear counterfactual and suffers from a host of poor evaluative design features. […] There is [therefore] a wide range of both supporting and opposing study results. » Thus, one must be careful claiming that PPPs are best able than TP to achieve a higher value-for-money, according to this survey of empirical works.

Source: Hodge and Greve (2009).

2.2 Empirical Evidence: Overview of Several PPPs Empirical Studies

In the previous section, I showed the situation of PPPs in Europe and two analyses concerning the efficiency of PFI contracts in the UK. However, the literature about PPP also offers several empirical issues linked to the theoretical framework. Thus, in this section, I will show the main methodology and results of some selected empirical works in order to illustrate how searchers have attempted to assess PPPs determinants. Nevertheless, due to limits of space here I do not aim at giving a complete survey of empirical PPP studies. Indeed, with the examples of water distribution in France, emergency medical services in the US, urban transport in France, toll road concessions in several countries and cleaning services in Sweden, the goal of this section is to give a broad overview of the variables and statistical concerns of PPP projects. These examples are eminent as they are related to the diverse relevant sectors and involve different models.

2.2.1 Evidences from Water Distribution in France

In this empirical study, Chong *et al.* (2006) seek to know how and why PPPs are chosen by local public authority in France concerning water distribution and they also assess the impact of such choices on performance. Chong et al. furthermore measure the performance of PPP contracts in regards to the price paid by consumers for a yearly consumption of 120 cubic meters of water in a local authority (variable *price*).

Authority in France can choose between two different kinds of governance, i.e. providing it on its own (variables *direct public management*) or externalizing the provision of water to a private firm (variable *intermediary management*, *gérance*, *lease contract* and *concession contract*). To assess the impact of this choice on price level, Chong *et al*. use explanatory variables that proxy (i) the complexity of the water treatment, (ii) where the water comes from (underground or surface), (iii) the degree of independence of a local authority regarding to its neighbours to supply its own demand, (iv) the volatility of demand (variable *touristic area*), (v) potential economies of scale, (vi) effects of market size and (vii) the costs related to control of water quality and network infrastructure. Moreover, they include in their regressions a variable that does not influence the price of water but influences the choice of the type of contracts, i.e. the variable

sanitation. Indeed, according to Chong *et al*. (2006, p. 162), the organizational choice in terms of sanitation may influence the choice of water distribution contract form without having any impact on prices.

Chong *et al.* use a database of 3650 water distribution contracts in France (of which 1132 are direct public management and 2073 lease contract) to regress the variables showed above and see the impact of organizational choices on prices. Their main results indicate that « choosing any kind of PPP over direct public management seems to increase the average retail price of water in a municipality » (Chong *et al.*, 2006, p. 163). They also show that local public authorities do not make the choice between public procurement and different forms of PPP for water distribution in France randomly. Furthermore, the results suggest « that efficiency consideration more than political one drive[s] their choices » (Chong *et al.*, 2006, p. 163).

2.2.2 Emergency Medical Services in the United States

David and Chiang (2009) analyse the Emergency Medical Services (EMS) case in 200 American cities for the years 1991, 1998 and 2005. They study the effect of cities' characteristics on the choices of EMS providers. Indeed, they observe that whereas first response cares are mostly provided by fire US department (i.e. the public sector), transport services involve a diversity of provider types (i.e. public-private cooperation schemes). Therefore, the authors use city-level data, hospital infrastructure and geographic and demographic data in order to estimate this effect.

To test their theory, David and Chiang (2009) use the variables *log population, hospital per 1000 square mile*, *city population share of Metropolitan Statistical Area* (MSA) and *population concentration in the MSA* in an Ordinary Least Squares regression, a random effect probit and a fixed effects regressions model. They find strong support for their theoretical insights. Indeed, their results show « a negative effect of population size, hospital density, and the interaction between the city share of MSA and population concentration in the MSA on the likelihood of choosing a mix public-private EMS configuration » (David and Chiang, 2009, p. 317).

2.2.3 Urban Transport in France

In the article of Roy and Yvrande-Billon (2007), the level of efficiency and the effects of ownership structure and regulatory contract in urban transport from 1995 to 2002 are studied *via* a panel of 165 networks. The authors use the following variables to set up their analyses.

To measure the output of urban transport, Roy and Yvrande-Billon take the number of vehicle-kilometres.[10] Concerning the input variables, they use the number of vehicles to evaluate the factor capital, while labour is measured by the number of employees and energy in diesel (m^3). Moreover, two control variables are added, i.e. the length of the network and the number of inhabitants. Finally, the authors introduce organisational variables (dummies) representing the different contractual possibilities, in a range from public operation to private one.[11]

Roy and Yvrande-Billon estimate a translogarithmic production frontier model in order to determine the efficiency of the studied ownership schemes. They find out that « public administration and semi-public companies exhibit higher technical inefficiency than private operators » (Roy and Yvrande-Billon, pp. 276-277). Therefore, choosing private companies appears to involve lower production costs. Furthermore, they also find low (but significant) variations in the technical efficiency of operators, which demonstrates that the urban traffic sector is highly regulated. Nevertheless and despite this regulation, private operators « manage to be more technically efficient than public administrations and semi-public operators » (Roy and Yvrande-Billon, p. 277).

2.2.4 Toll Road Concessions

Athias and Saussier (2007) use a database of 70 worldwide toll road concession contracts in order to assess the determinants of the flexibility (or rigidity) of such

[10] Therefore, the authors do not take into account any demand-related measures that are seen as being more relevant according to some authors. For the reasons leading to the choice to use demand-related measures refer to Roy and Yvrande-Billon (2007, pp. 270-271).

[11] When the operator is a private firm, the contract can be a management contract, a gross cost contract or a net cost contract. For more information, refer to Roy and Yvrande-Billon (2007, p. 261).

contracts. The dependent variables are a set of 11 types of contracts ranked from low rigidity price clauses to higher rigidity.[12]

The explanatory variables include uncertainty measures related to construction costs and future traffic (variables *complexité* and *trafic*). Another source of uncertainty is also measured by the length of the contract duration from the end of the construction to the end of the concession contract (variable *durée*). Since the reputation of the contractors can influence the renegotiation costs, Athias and Saussier (2007) use the number of past contracts between the contractors (variable *contrat répété*) and the political ideology of the authority (dummy variable *gauche*) to assess this effect. The institutional framework is also taken into account, as strong regulation should theoretically involve more contract rigidity. Finally, the dummy variable *avenant* (taking the value 1 in case of renegotiated contracts), a variable measuring the number of bidders and one measuring the experience of the authority with PPP are also added in the model.

The results of their regressions show that uncertainty about future traffic is an important variable concerning the choice of adaptation prices procedures. Indeed, the higher the uncertainty, the more flexible are the price clauses. In the five models tested by the authors, the variable *trafic* is always statistically significant at a 0.001 level. However, the complexity of the construction is not significant.

Furthermore, the variables measuring the trust between public and private partners, as well as the institutional and political frameworks seem to considerably influence the level of contract rigidity. Indeed, a strong regulation involves more flexibility, whereas a left political environment is likely to imply more rigidity. Finally, the number of bidders is also positively significant, which means that more bidders rigidifies the contract. To sum up, « [the] results stress the importance of uncertainty, informal relationships, and political and institutional frameworks concerning the design of PPPs » (Athias and Saussier, 2007, p. 275, *translation*).

[12] Two kinds of price adaptation procedures are observed in toll road concession contracts: automatic procedures and renegotiation procedures. Refer to Athias and Saussier (2007, pp. 570-571) for more details.

2.2.5 Bidding in Swedish Cleaning Contracts

A substantial part of the theoretical framework concerning PPP, and more generally public procurement, is devoted to the auction process of choosing a private firm to realize certain tasks for the public sector. Hyytinen *et al.* (2007) thus try to assess the determinants of bidding in public procurements, regarding to a database of 5926 bids in Sweden between 1990 and 1998 for cleaning services.[13] Indeed, they observed that « the lowest bidder does not win 58% of the time, and conditional on the lowest bid winning, the municipalities end up paying on average 43% more than the lowest bid » (Hyytinen *et al.*, 2007, p. 24). Therefore, they seek to explain these facts *via* an empirical analysis.

To describe the municipalities, the authors use data on the unemployment rate, population density, average income and a measure of political ideology (i.e. the dummy red_m that takes the value 1 if there is a leftwing majority and 0 otherwise). The objects (subject to cleaning) are characterized by the size, contract length, prolongation period and required cleaning frequency. Finally, the cleaning firms are separated into four categories, depending on their size.

Hyytinen *et al.* (2007) use the following indirect utility function of municipality m that chooses the bidder j to clean the object i:

$$U_{mij} = \psi_{mi} - \eta_{mi} \times bid_{mij} + q_{mij} + mup_{mij} + f_{mij} + \varepsilon_{mij} \qquad (2.1)$$

where ψ_{mi} refers to the characteristics named above, bid_{mij} to the bid price, q_{mij} the quality, mup_{mij} to multi-object procurement effects, f_{mij} to favouritism effects and ε_{mij} to an error term.[14]

The results of the different specifications are close to each other and lead the authors to the following conclusions: (i) leftwing municipalities are more price-sensitive, (ii) the less weight put on price in rightwing councils, the more there are bidders, (iii) municipalities have taken into account the multi-object aspect (despite the fact that procurement rules allowed firms to submit one bid per object) and (iv) leftwing councils seem to practice favouritism in choosing the private firm. Therefore, one can see that « politics matters and affects the

[13] The cleaning services mostly concern schools and day-care centres.
[14] For details about each parameter, see Hyytinen *et al.* (2007, pp. 11-16).

bureaucrat's incentives to allocate procurement contracts […] [and that] the institutional procurement environment leaves room for discretion » (Hyytinen *et al.*, 2007, p. 24).

Beside the five studies presented in detail above, there are many other empirical works concerning PPPs, and more generally public procurements. Hereafter, these studies are shortly introduced in order to highlight the different topics analysed by the searchers. However, due to a lack of time, the methodologies and results are not given. Therefore, for more information, the lector must refer to the studies themselves.

The empirical literature can be divided into three main categories of articles. First, the most important field concerns auction theory applied to public procurement. In that respect, Porter and Zona (1993) offer one of the first articles concerning the results of bidding in auctions with collusion opportunities in state highway construction contracts. Szymanski (1996) studies the impact on cost savings of competitive tendering in British local authorities. Later, Hong and Shum (1999) assess the equilibrium of procurement auctions in New Jersey. Gómez-Lobo and Szymanski (2001) analyse the relationship between the number of bidders and the costs of projects in the UK. Bajari *et al.* (2003) use a database of building contracts in Northern California to show whether bidding is more efficient than negotiation.

Furthermore, still in the field of auction, Estache *et al.* (2008) study the efficiency of multidimensional auctions in road and railway concessions in Latin America. Estache and Iimi (2010) evaluate the bidding process in different sector with an asymmetric auction theory. Bajari *et al.* (2006) assess the efficiency of the bidding process within data from highways paving contract. The relationship between bidding and transparency in municipal public works auction is studied by Ohashi (2009), while De Silva *et al.* (2005) focus on the relationship between bidding and information in highway procurement contracts in Texas and Oklahoma. Moreover, Engel *et al.* (2006) make a review of experience and issues of auction process concerning toll road concession in the US. Finally, it is worth mentioning the article of Athias and Nuñez (2008), which assess the effects of the winner's curse in bidding for toll road concessions.

The second category includes papers related to corruption in public procurement. Indeed, Büchner *et al.* (2006) and Barr *et al.* (2009) realised two experimental studies about respectively bribery in procurement contracts and the relationship between corruption and different institutional environments. Concerning the same topic, Martimort and Straub (2006) analyse the effects of corruption on changes in public utilities ownership structure in Latin America.

The third category of articles concerns more generally the efficiency of PPPs. In that respect, one can quote the article of Levin and Tadelist (2010) concerning the efficiency and costs of contract administration in US Cities. Furthermore, Gagnepain and Ivaldi (2002) analyse the efficiency of the French urban transport industry within the theory of regulation. Finally, Yuan *et al.* (2009) evaluate fifteen performance objectives commonly used for estimating the value-for-money of PPPs.

Beside these categories, two articles should finally be mentioned here. Indeed, the article of Engel *et al.* (2009) concerns the effects of renegotiation in PPP contracts with the empirical example of the Chilean PPP program. Moreover, Guasch (2004) deeply analyses the design and the implementation of concession contracts in Latin America.

To conclude, one can see that the several empirical studies presented in this section concern different issues and results do not always support the theory. Indeed, as illustrated by the case of the water distribution in France, traditional procurement seems to be more efficient than PPP. Nevertheless, it seems to be the opposite situation in the case of urban transport in France. These different results illustrate an issue already mentioned in the chapter 1: PPPs are not more efficient than traditional procurement *per se* and each situation should be carefully studied.

Furthermore, according to the analyses of cleaning services in Sweden, efficiency is not the only concern when a public authority has to choose a way of providing a service. Similarly, the case of toll road concessions illustrates that the political and institutional frameworks plays an important role in the design of PPP contracts. Therefore, all of these parameters must be taken into account before claiming that PPPs are more efficient than in-house provisions. Indeed, the political environment in which PPPs are, with problems like bribery or

favouritism, can cause uncertainty and increasing transaction costs and thus decrease the interest in PPPs.

Chapter 3 Two Practical Case Studies: PPPs in Germany and in Switzerland

This chapter includes the study of two practical cases, namely the PPP experiences of Germany and Switzerland. In the chapter 2, I showed the evolution of PPPs in Europe. Therefore, it is worth presenting here in detail one of these European countries, focusing especially on how Germany introduced a real PPPs program. The reasons justifying the choice of this country are presented hereafter. In the section 3.2, the PPP situation in Switzerland is analysed. The reasons of the Swiss lag concerning PPPs relatively to its neighbours are stressed, followed by the step already made in this field.

3.1 Development of PPPs in Germany: Empirical Overview and Institutional Framework

Germany seems to be the country from which Switzerland could learn the most in terms of Public-Private Partnership. Thus, it is interesting for my paper to study how PPPs have been set up there in order to get an example, which could be cautiously followed by Switzerland. As a comparison, an overview of PPP projects in Germany will be set up, regarding to the number of projects, their value and the most concerned sectors. Finally, the subsection 2.2.3 details the different institutional and/or legal steps made in Germany concerning PPPs. I will focus on the founding of Task force in charge of supervising PPPs and the legal framework and adaptations made in order to facilitate the development of PPP projects.

3.1.1 Germany as a Good Example for Switzerland?

According to Bolz (2005, p. 301), Germany is an interesting country for Switzerland in terms of PPPs. Indeed, the institutional and legal frameworks are much more closer between the two countries than they are concerning Switzerland and the UK, France or Spain. Decentralization is actually high in both of the countries,[1] and one can see a similarity between *Bundesländers* in Germany and

[1] The comparison in terms of *decentralization* must however be taken with caution. Indeed, both Switzerland and Germany can be considered as federal states, but Switzerland is more

Cantons in Switzerland. Moreover, an important quantity of analyses, papers and studies concerning PPPs has been made in Germany. These ones are often written in German and, thus, that presents an important source of useful information that Switzerland could use in order to develop its own way of managing PPPs.

Furthermore, the consulting company *ÖPP Deutschland* offers plenty of information on its website as well as a complete database including all the PPPs in Germany.[2] Hence, a precise and complete overview of the different characteristics of the PPPs market in Germany can be realised.

3.1.2 Empirical Overview of PPPs in Germany: Evolution of the PPP Market and Distribution across sector

For this section, I use the data available on the website of *ÖPP Deutschland*, namely the national independent consulting company providing PPPs advices. A database listening all the PPP projects in Germany is kept up to date. PPPs, whose contracts have been signed since 2002, are included, as well as the projects called for tenders since 2009. The total number of PPP projects is 219, of them 163 have already been signed. The total value of investment on these projects comes to €4650.40 million.[3]

The graph 2.7 shows that *education* is the main sector concerned by PPPs in Germany,[4] with a total number of 79 projects for a total investment amount of €1443.99 million (for 56 available projects), which represent respectively 36 percent of the total number of projects (see graph 2.8) and 31 percent of the total investment volume (see graph 2.9). Then, in terms of numbers, *culture and sport* includes 50 projects, namely 23 percent of the total, whereas *administration* includes 32 projects (14.6 percent). However, in terms of investment values, *traffic* is the second most important sector, with a total of €1040 million (22 percent of the total, according to the graph 2.9), followed by *healthcare*, with a

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decentralized as the decentralization follows there a *bottom-up* scheme, while Germany follows a *top-down* scheme (Dafflon and Madiès, 2008).

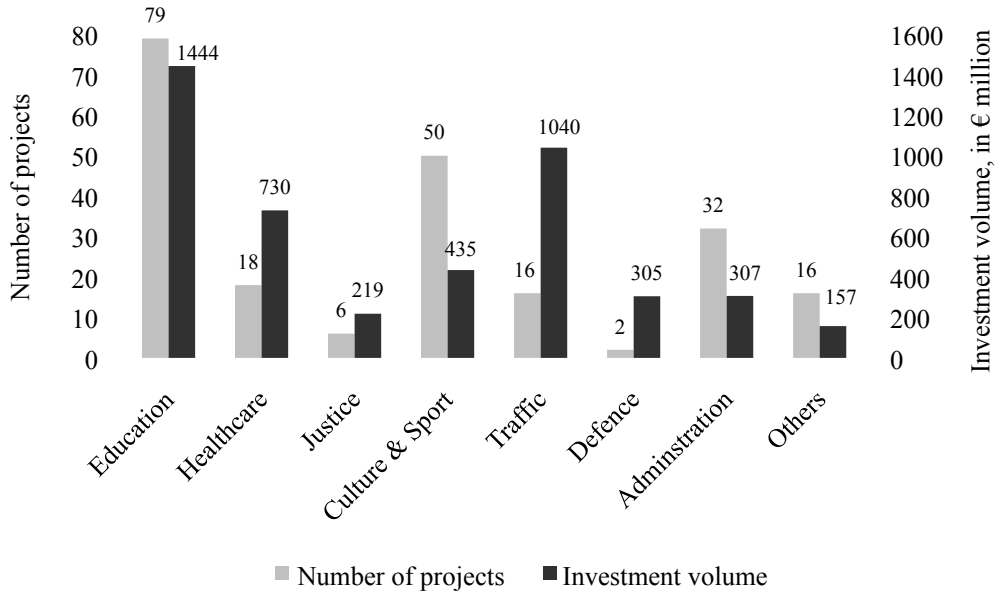
[2] For more information about ÖPP Deutschland, refer to the website: http://www.partnerschaften-deutschland.de.

[3] The total value of investments concerns 136 projects on the 219 available, as the information is not available for all of them.

[4] The sector *education* concerns mainly building and maintaining schools (more than ninety-one percent of the total number of projects) and early childhood education and care facilities (six percent of the total).

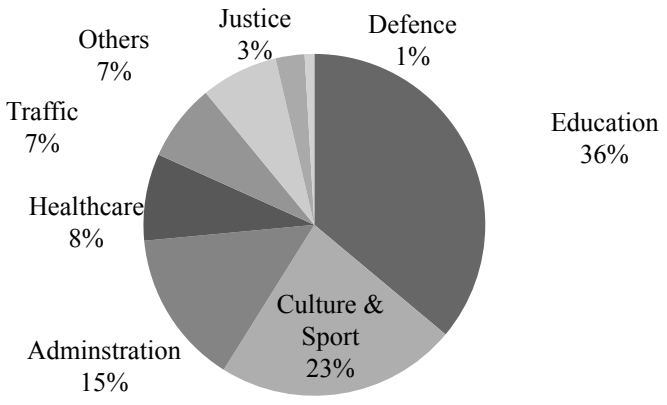
total investment value of €729.8 million (16 percent of the total). The rest of the projects are divided up between the categories *justice*, *defence* and *others* (which includes, for instance, fire stations). Several interesting points can thus be highlighted.

Graph 2.7 Number (left-hand axis) and Value of Investment (in € mio, right-hand axis) of PPPs in Germany[5]



*Source: Database of ÖPP Deutschland (*http://www.ppp-projektdatenbank.de*), 2011-4-29.*

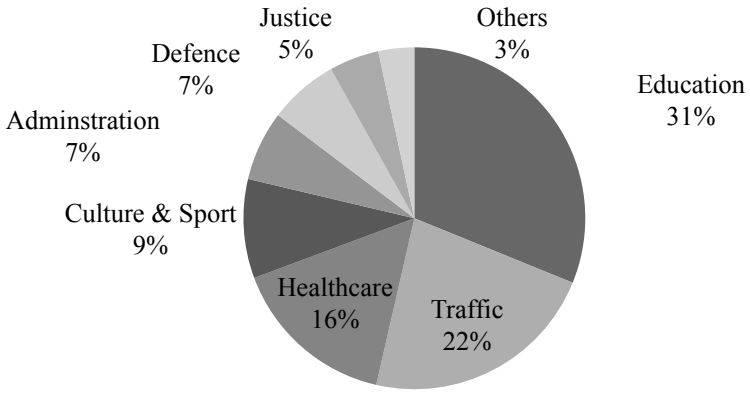
Graph 2.8 Number of PPPs by sector in Germany, in %



Source: Database of ÖPP Deutschland (http://www.ppp-projektdatenbank.de), 2011-4-29.

[5] As the investment value is not available for all of the projects, the value *number* and *investment value* given in the graph 2.7 cannot be compared. See table 2.2 for a comparison.

Graph 2.9 Value of investments in PPPs by sector in Germany, in %[6]



Source: Database of ÖPP Deutschland (http://www.ppp-projektdatenbank.de), 2011-4-29.

First of all, as mentioned above, *education* is the most important sector in Germany, in both terms of number of PPPs projects and of PPPs' investment values. The development in Germany is therefore similar to the global European trend stressed in the section 2.1. Indeed, the graph 2.5 shows that *education* concerns 34 percent of the number of PPPs in Europe, whereas 36 percent of the projects in Germany belong to this sector. As shown in the table 2.2, the average investment value of the projects in *education* is relatively small in comparison to other sectors like *traffic*, *defence* or *healthcare*. However, the size of investment value of each project can vary significantly, within a range from €2.8 million to €131 million and with a rather high relative standard deviation. The following example of new buildings and renovations of schools in Monheim am Rhein (Bundesland Nordrhein-Westfalen) illustrates a PPP school pilot project in Germany:

> In 2004, the city of Monheim signed a contract with the firm Hermann Kirchner to renovate old school buildings and create new ones. The investment volume was €24 million and the whole project reaches an amount of €75 million, including the operating and maintenance tasks. The contract have been signed for twenty-five years and the municipality committed itself to pay each year a €3 million grant to the private company, following a *PPP-Inhabermodell* (see box 2.2). According to analyses made in the frame of this contract, the resort to a PPP scheme lead to an

[6] These amounts concern the following numbers of projects in each sector: *education*: 56, *healthcare*: 7, *justice*: 4, *culture and sport*: 34, *traffic*: 9, *defence*: 2, *administration*: 17, *others*: 6.

advantage of efficiency of 15,2 percent, in comparison with what the public sector would have to pay under traditional procurement.

Sources: ÖPP Deutschland, Bingisser et al. (2005, p. 7).

Second, the sector *traffic* is here comparable to *transport* in the section 2.1. As shown in the graph 2.7, there is relatively not a high number of PPP projects in this sector, but each of them involve an important investment. Indeed, according to the table 2.2, the average investment value of the 9 projects for which data are available is €114 million, within a broad range of projects from €3.5 million to €650 million. However, the data include two massive projects with respectively €650 and €300 million of investment value which involve a high relative standard deviation (1.81). Without these projects, the average falls to €12.86 for 7 projects, which seems to be more representative to the PPPs in the *traffic* sector in Germany. Nevertheless, there is not enough available data to go deeper in a significant analysis and the value given here must be taken with caution.

Table 2.2 Average value of investment per PPPs project in Germany by sector, in € mio

Sector	Number of projects	Average value per project, in € mio	Smallest value, in € mio	Highest value, in € mio	Relative Standard Deviation
Education	56	20.18	2.8	131	1.04
Healthcare	7	76.00	1.7	250	0.82
Justice	4	47.75	25	100	0.56
Culture and Sport	34	7.47	1.2	99.30	1.27
Traffic	9	113.89	3.5	650	1.81
Defence	2	152.50	60	245	0.61
Administration	17	14.94	4.58	45	0.62
Others	6	21.50	1.7	120	1.61
Total	135	28.30	-	-	-

Source: Database of ÖPP Deutschland (http://www.ppp-projektdatenbank.de), 2011-4-29.

Finally, the sectors *culture and sport* and *administration* are composed of several projects with a relatively low level of investment. The average value of investment for 34 projects in *culture and sport* is 7.47, whereas the one of *administration* for 17 projects is 14.94. Thus, a main insight related to the empirical experience of PPPs in Germany is that several sectors are concerned

and that the size of the projects broadly varies. That shows a certain flexibility of PPPs' contract, which can be adapted to every circumstance and characteristic of the related public needs. Therefore, different models of contract are used in Germany. The box 2.2 shows the main features of these models.

Box 2.2 The PPP schemes in Germany

Different models of PPPs contract are used in Germany, in order to fit as well as possible with the characteristics of each project. These models are explained in the following:

1. *Verfügbarkeitsmodelle* (e.g. availability models)

- *PPP-Erwerbermodell (E-Modell)*

This model can be seen as an « acquisition model ». Indeed, the private partner owns the real estate and manages the planning, building, financing and operating phases. At the end of the contract, the property rights are transferred to the public sector. Payments are made by periodical charges.

- *PPP-Inhabermodell (I-Modell)*

It can be seen as an « ownership model ». The private partner plans, builds, finances and operates an asset, whereas the public sector remains the owner. The main difference with the *E-Modell* is precisely this ownership issue, as payments are made by periodical charges also in the *I-Modell*.

- *PPP-Leasingmodell (L-Modell)*

The private partner manages all the phases. At the end of the contract, there is no liability to transfer the property right to the public sector. Indeed, the private has the possibility to either give back the asset or buy it for a value calculated *ex ante*, or even extend the renting period. Payments are made by instalments related to the buying option, as well as by periodical charges.

- *PPP-Mietmodell (M-Modell)*

One can translate that as « rental model ». This model is similar to the *L-Modell*, excepted that there is no buying option at the end of the contract.

2. *PPP-Konzessionsmodelle* (e.g. concession models) *(K-Modell)*

The private partner is committed to build and operate an asset for the public

sector. Payments come from direct user fees or through the public sector via shadow tolls. Within this category, one finds the so-called *A-Modell* and *F-Modell*.

3. *PPP-Gesellschaftsmodell* *(G-Modell)*

The private and the public sectors manage the facility together within Trusts, where both sides are represented. This model includes several elements from the other models mentioned above.

Source: ÖPP Deutschland, "PPP Modelle", available on the website < http://www.ppp-projektdatenbank.de/index.php?id=31&PHPSESSID=a5f49a783b1908cee8aa41d971882851>, consulted the 2011-05-05.

3.1.3 The Institutional and Legal Implementation of PPPs in Germany

The PPP market in Germany is still young, as the first projects not really started until 2003. However, since then the interest demonstrated by the public and private partners has grown up fast and PPPs have now an important place in the political debate (PricewaterhouseCoopers, 2005, p. 40). The table 2.3 shows the main steps concerning PPPs on the institutional level. This list is based on different articles and information found on the website of ÖPP Deutschland AG. However, the goal here is not to draw up a perfect inventory but to show the mechanism that reinforced PPPs in Germany. Two important issues can be drawn from table 2.3.

Table 2.3 Institutional and legal developments related to PPPs at national and subnational level in Germany

Year	National level	Subnational level
1994	• 'Trunk Road Construction Private Financing Act'	
2001	• Foundation of an Inter-Ministerial Working Group – Private Finance Initiative	• North Rhine Westphalia: PPP Task Force NRW
2002	• Creation of a Federal PPP Competence Centre announced by the Chancellor • Constitution of a Steering Committee PPP	
2003	• Report from the Steering Committee: 'Federal Report on PPP in Public Real Estate'	

2004	• Foundation of the Federal PPP Task Force (PPP-TF) as a part of the Federal Ministry of Transport, Building and Urban Affairs	• Schleswig-Holstein: PPP Centre of Excellence • Baden-Württemberg: PPP-TF • Berlin/Brandenburg: RfBB – Regionalforum and PPP Berlin-Brandenburg • Thuringia: PPP Working Group
2005	• Objective of the new coalition government: PPPs should reach 15% of the public procurements • Adoption of the PPP-Acceleration Act by the Parliament	• Saxony-Anhalt: Projectgroup PPP • Hessen: PPP Centre of Excellence
2006	• Standard guidelines on examining profitability	
2007	• Federation/federal states working committee and Federal Ministry of Finance publish recommendations on PPP in the federal budget system	
2009	• ÖPP Deutschland AG	

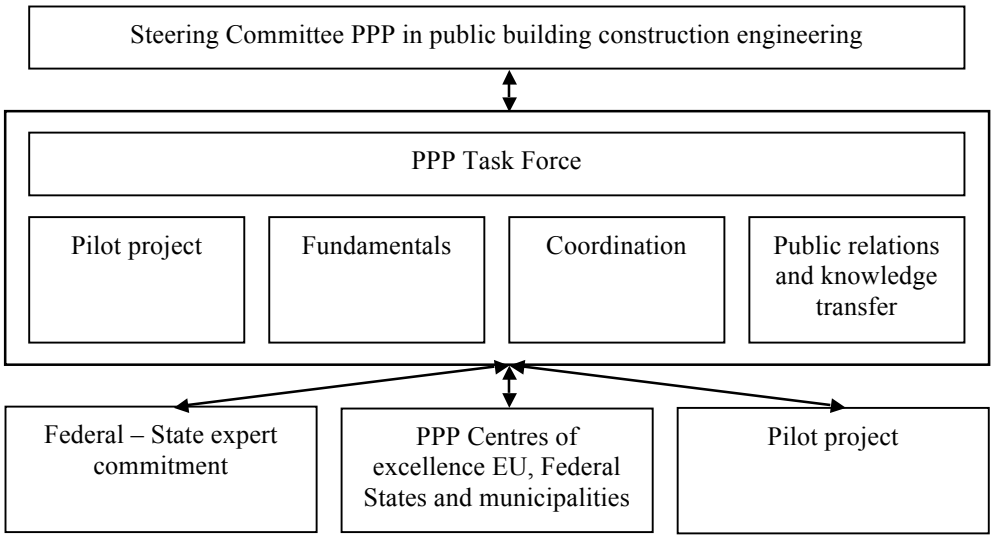
Sources: Alfen and Leupold (2007), Alfen et al. (2006), ÖPP Deutschland AG.

First, the formation of PPP Task Forces and Centres of Competence on both national and subnational level is one of the key points of PPPs development in the country. Indeed, according to Alfen *et al.* (2006, p. 546), « from the institutional economics perspective, PPP as a joint-governance driven by value chain integration/lifecycle management and state involvement through PPP Task Forces has proven to be an efficient way to deliver public real estate projects. » The authors notice that since Task Forces and Centres of Excellence have been set up in Germany, a considerable increase in the number of PPPs can be observed. The federal PPP network in Germany is illustrated in the figure 2.1.

Whereas the role of the Steering Committee is to promote improvements in the general conditions and create a network of experts, the PPP Task Force focuses rather on the project level. At the Federal States level, the different following tasks are assigned to the Competence Centres (Alfen *et al.*, 2006, p. 544): (i) delivering a contact point for municipalities interested in accomplishing projects, (ii) building a network of stakeholders, (iii) publishing relevant and updated information about developments, (iv) holding information meetings as discussion forum and opportunity for exchange of experience, (v) supporting pilot

projects in the particular Federal States and finally (vi) standardising the process to decrease transaction costs.

Figure 2.1 Federal PPP network of excellence in Germany in 2006[7]



Source: Alfen et al. (2006, p. 544).

According to Allen *et al.* (2006, p. 547), « Task Forces as institutions have been seen to be vital for joint-governance systems like PPP, because they enforce state/corporate collaborations. » Indeed, as PPPs involve a long-term cooperation between the public sector and private partners, it seems essential to build institutions that offer a bridge between the different partners. Furthermore, Task Forces can accumulate knowledge and experiences, in order to reinstate them for new projects. They can also collect data, which can be useful for different studies concerning the efficiency of PPPs.

The example of Germany is particularly interesting for Switzerland, in the sense that several Centres of Competence have been developed at the subnational level, what allows them to focus more on the specific conditions of the concerned *Bundesland*. However, as mentioned by Freshfields Bruckhaus Deringer (2005, p. 23), « the multiplication of effort does not guarantee better quality projects, but has resulted in a large variety of approaches. […] [Furthermore,] there will most likely never be one central or standard approach to PPP in Germany. » Yet, this is

[7] This network may have changed since 2006. However, the objective of this subsection is to understand the process in Germany and not to provide a precise description of the actual system, therefore it is not necessary to work with a more recent data.

not necessarily a bad side of the system, provided that each regional project can be approached by the same means. Moreover, there are not many projects that concern the national level.

Second, the table 2.3 shows that different legal steps have been realized in order to facilitate the setting up of PPPs in Germany. As Germany has different levels of legal authority, variations that could have been made in each *Bundesland* are not represented here. However, it is not worth it to describe in this paper all the adaptations made in the scope of the legal framework but to show that the increase of PPPs in Germany also went with developments in this area.

The most important step, namely the federal PPP Acceleration Act (*ÖPPBeschleunigungsgesetz*), came into force in 2005. According to Schaefer and Voland (2009), « this act is a framework law, which has changed a number of previously existing provisions relevant to operating PPPs, including the Act Against Restraints of Competition, the Public Procurement Ordinance, the Federal Budget Law, the Federal Law in Investment and tax laws. » In order to facilitate PPPs, changes or adaptations were effectively necessary because most of the laws concerning PPPs were first meant for traditional public procurement. As one can see, several different laws are concerned by such changes, thus the process can be long and complicated.

Roughly, the Acceleration Act clarified the meaning of *public contract* in order to facilitate the determination of applicable law. Moreover, it modified the Federal Budget Law, among others to « take into account the assumption of risk in assessing the economic efficiency of a project as a condition for compliance with the Federal Budget Law » (Schaefer and Voland, 2009). As mentioned above, risk allocation is a key point concerning PPPs, therefore such a modification appear to be a condition important of an efficient development of PPPs policy in a country. However, each country has its own laws and the adaptations made in Germany cannot be followed blindly. Each case should be studied separately in order to find where are the difficulties and what should be changed in order to facilitate PPPs.

3.2 The PPP Market in Switzerland

In comparison with its European neighbours, Switzerland is, concerning the development of PPPs, at a relatively late time. According to Lienhard (2006, p. 549), in Switzerland « there is a considerably lower development status and level of scientific investigation [about PPPs] than in other European countries. » Indeed, the literature on this subject is quite nominal relatively to these countries, focusing rather on institutional and legal topics while missing empirical studies on PPPs. There is a few empirical works, which merely detail numerous projects called PPPs in Switzerland.[8] Moreover, it does not seem to be an actual political homogeneous wish to resort to PPPs. However, the interest of using such a kind of mean to provide public utilities is growing, and steps are made in order to facilitate such a development. The foundation of the association *PPP-Schweiz* in 2006 is a good example for this development.[9]

In this chapter, I will first explain the reasons why PPPs have not been developed in Switzerland to the same amount as in other countries. Then, an overview about the actual situation will be given, regarding to political, institutional and private points of view. Finally, the potential of PPPs in Switzerland will be described, concerning mainly the fields in which PPP projects could be implemented and in which they could not. However, I do not pretend giving here a comprehensive survey of PPPs in Switzerland. The insight of this chapter is more to give several leads for further studies.

3.2.1 Origin of the Lag in Terms of PPPs in Switzerland

The few attempts to set up PPPs in Switzerland hardly worked out or even failed, due to highly complicated processes and legal obstacles (Bingisser *et al.*, p. 11). However, these problems do not occur only in Switzerland and cannot alone justify the lag of PPPs. Such being the case, the causes must be found somewhere

[8] There are two main publications looking deeply into the PPPs' situation in Switzerland, e.g. Bolz (2005) and Ehrensperger (2007). Bolz gives a complete overview about PPPs in Switzerland, from a theoretic analysis to the analysis of the Swiss potential for PPPs. Ehrensperger also explores the theoretical framework of PPPs and gives a precise overview of PPPs in public infrastructure and the transfer of the so-called "PPP approach" *via* a survey of cantonal construction and finance departments.

[9] *PPP-Schweiz* is an association formed by private and public partners, offering assistance in developing PPPs in Switzerland and publications on this topic. More details concerning its role and the institution's usefulness will be given at a later time in this chapter.

else. According to Bolz (2005, p. 70), the following reasons can be pointed out, explaining why Switzerland started later than other European countries to resort to PPPs: (i) healthy financing situation of the public sector; (ii) the absence of accumulated needs; (iii) a long and strong cooperation between the private sector and the public sector already existing; (iv) gaps in incentives' mechanisms in favour of specific financing instruments; (v) diverse remaining institutional and political reasons. Each of these causes will thus be detailed hereafter.

(i) The financing condition of the public sector

In comparison with European countries, the pressures on the public finance are relatively low. Indeed, Switzerland is not subject to the Maastricht Criteria, which represent strong constraints to governments' spending. Of course, that does not mean that the Swiss public sector has a total freedom concerning its budget, but « at least until a few years ago, the pressure was massively stronger abroad than it was in Switzerland » (Bolz, p. 70, *translation*). Therefore, these countries turned towards PPPs in order to finance huge infrastructure projects without having to pay for them completely, as a variable share of the financing came from the private sector.[10] Furthermore, the potential cost-savings linked with PPPs were thus really attractive.

Moreover, according to Bingisser *et al.* (2005, p. 11), the public sector in Switzerland benefits from excellent credit rating. Then, the costs of financing are lower than they are in other European countries. Therefore, it has not been necessary to find other means of founding to afford huge infrastructure projects.

(ii) Absence of accumulated needs

From a general point of view, there are no strong accumulated needs in infrastructure sectors in Switzerland, which is, in contrast, often the case in Eastern European and other developing countries. Thus, their need for building huge facilities – such as railway or highways – appeared to be a good opportunity to launch PPP projects. Nevertheless, this argument is not specific to Switzerland. Indeed, countries like the UK or Germany also did not have strong accumulated needs, but they still developed their PPPs' markets faster than Switzerland.

[10] As explained in the chapter 1, the financing argument should not be a reason to resort to PPP-schemes. However, in practice it is often the case, hence it is important to mention it here.

However, as such needs were not strong in Switzerland, this can partially explain the absence of a general debate concerning the usefulness of PPP.

(iii) Strong cooperation between the private and the public sector

In Switzerland, there is already a strong cooperation between the public sector and the private partners in sectors like waste management, transport and energy. According to Bingisser *et al.* (2005, p. 10, *translation*), « the legislation has always provided the basal to these interactions. » This argument can be seen as both pro and con for the expansion of PPPs. Indeed, on the one hand, private partners involved in public facilities seem to be broadly accepted by the population. Therefore, it would not be an overly difficult task to persuade the population to accept PPP schemes, which is a particularly important step in a highly democratic country like Switzerland. On the other hand, the actual cooperation between the private and the public sectors seems to work well and to be satisfactory. Thus, one can ask why traditional public procurements should be replaced, while they appear to be a good way of providing public services.

(iv) Gaps in incentive mechanisms

The special financing of road traffic and public transports and the incentives to finance huge urban infrastructure projects provided by the Confederation and the Cantons do not encourage PPPs (Bolz, 2005, p. 70). For instance, in Switzerland, the revenue of the tax on mineral oil is used to finance the national and subnational roads.[11] Hence, as long as there are such mechanisms to provide the financing of roads, there is no incentive to develop other kinds of means for building and maintaining roads.

(v) Other causes

A few other reasons can be pointed out to explain the lag related to PPP projects in Switzerland. On can mention, for instance, the proportion of local community and administration, which is high in Switzerland. According to Grütter (2010, p. 44), that represents a difficulty in the PPP developing process, because the more diversified the administrations and local authorities are, the harder it is to standardise this process. Moreover, the small size of communities in Switzerland

[11] C.f. *Loi fédérale concernant l'utilisation de l'impôt sur les huiles minérales à affectation obligatoire.*

does not facilitate the resort to PPPs. Indeed, many different authorities would be involved in the process, making the consensus more difficult.

Some legal barriers can also be seen as obstacles to the use of PPP schemes.[12] For instance, Lienhard (2006, p. 555) mentions the basic prohibition of road pricing anchored in the Constitution (art. 82) as an impediment for PPP projects. Indeed, because of such a prohibition, concession models, in which direct user fees pay the private partner, cannot be set up. Furthermore, Bolz (2005, p. 70, *translation*) notices that « the specific Swiss administration's culture, the direct democracy [and the fact that] Switzerland often reacts with delay to international changes » are also factors explaining the lag related to PPPs in an international comparison.

The different points named above are important obstacles that slow down the process of developing PPPs in Switzerland. However, each country has its own hindrances, and solutions had to be found in order to resolve them. As shown in the chapter 2, Germany made a strong effort to facilitate the legal process of PPPs, with, for instance, the so-called *PPP-Acceleration Act*. Therefore, the obstacles faced by Switzerland have to be studied in order to find the best solution that would allow the implementation of PPPs despite these barriers, or, even better, that would include them into the process. Nevertheless, the lag in PPPs in Switzerland does not mean that nothing has been done up until today. Thus, the next section will show the actual situation of PPPs in Switzerland in more detail.

3.2.2 PPPs in Switzerland: Actual Situation and Potential

As mentioned above, even if PPPs in Switzerland are not developed as intense as they are in other European countries, the interest is growing and a few steps have already been made to facilitate the process. In this section, I will first look to these steps and several projects, usually admitted as being PPPs, will be presented. Furthermore, the association *PPP-Schweiz* will be roughly described, as it is the only « task force » in Switzerland. Then, *via* a look into the Swiss Law, and examples of the activities of the State Secretariat for Economic Affairs (hereafter referred as SECO) and the Swiss army, I will illustrate that the interest for PPPs

[12] For more detail about the PPP legal issues in Switzerland, see Bolz (2005, pp. 211-296), Ehrensperger (2007, pp. 219-237) and Zufferey (2010).

has been increasing, yet not remaining homogeneous. Finally, the PPPs' potential in the sectors of public infrastructure and traffic will be analysed.

3.2.2.1 Example of PPP Projects in Switzerland and the Association *PPP-Schweiz* as a Network of Competence

As shown in the chapter 2 with the example of Germany, the growth of the resort to PPP projects cannot be made without special Task Forces and/or Centres of Excellence. Therefore, in order to promote PPPs in Switzerland, an association named *PPP-Schweiz* has been established the 16th of May 2006.[13] Different representatives from the Confederation, Cantons, cities as well as scientific and economic circles form this association. It pursues the following objectives:

- Promote the standardisation of PPPs in Switzerland as a mean to offer public services;
- Position PPPs as quality standards;
- Encourage the public sector to resort to PPPs.

On the website of the association, several interesting items are available. One can find literature concerning PPPs, both about Switzerland and foreign countries. Moreover, *PPP-Schweiz* organises meetings to exchange information and points of view concerning PPPs. The website gives insights into summaries of these meetings and the opinions of the main Swiss economic actors. There is also a database including the PPP projects in Switzerland. In total, thirteen projects are precisely described. The state of process of each project is given, as well as financial and technical information and the name of the public and private partners. The table 3.1 details three of these projects.

It is worth to estimate the quality of *PPP-Schweiz* as an expertise network to promote PPPs. Indeed, even if it is a good starting point to increase the resort to PPPs in Switzerland, one can find several elements that should be improved. First of all, a strong definition of PPP must be given. This is of course not an easy task because the term PPP has different meanings across countries, but it is important to give the precise characteristics of projects entering in the scope of PPP.

[13] The information given in this section has been drawn from the website of *PPP-Schweiz*: http://www.ppp-schweiz.ch. For more details, refer to it.

However, as the use of PPP is relatively young in Switzerland, it is perhaps too early to be able to give such a definition. Furthermore, the database available on the website seems to be incomplete. For instance, the project *Schule im Netz*, described in the table 3.1, is often cited as a PPP in the related literature but cannot be found in the database.[14]

Table 3.1 PPPs in Switzerland: three examples

Name	City / Canton	Description
Stadium "La Maladière"	Neuchâtel	The football Stadium "La Maladière" was built and is operated as an "acquisition PPP". This complex is made of a football stadium of 12'500 seats, a Coop shopping centre, six gyms, an emergency supply and fire service depot and an underground car park. The construction started in 2004 and was finished in 2007, followed by the operation period. The contract period between the project's Trusts and the public sector is from 10 to 20 years. This PPP results mainly from cooperation between the city of Neuchâtel, HRS, Coop, Publica and Swisscanto. The total investment amount was about CHF 200 Mio.
Greater Zürich Area GZA	Cities of Zürich and Winterthur and 6 Cantons	The GZA is a foundation established in 1998 and composed by 6 Cantons (Zürich, Glarus, Schwyz, Grisons, Schaffhausen and Solothurn), 2 cities (Zürich and Winterthur) and private companies (Credit Suisse, Unique Zürich Airport, Allreal Holding AG, Implenia, etc.). Its aims are to promote the area of Zürich in order to convince international companies to locate here and offer tailor-made support when companies make claims to settle. The PPP is realised as a task fulfilment model and the budget for the year 2008 was CHF 4.2 Mio.
Schule im Netz	Confederation	The project "PPP – Schule im Netz" was launched in 2000 and includes the participation of the Confederations, the Cantons and several private firms from the field of informatics technologies (Swisscom, Dell, Apple, etc.). The goal is to improve the access and use of new information technologies in the Swiss primary and secondary schools. The partnerships work as follow: privates firms provide infrastructure and network services, the Cantons develop the multimedia content and ensure that teachers get the appropriate training, and the Confederation supports the Cantons by providing 80% of the financing.

Sources: https://www.ppp-schweiz.ch (the 2011-05-09), Hofmeister and Borchert (2004).

[14] The third project *Schule im Netz* has not been found on the website of *PPP-Schweiz*, but this project is often cited as PPP in publications (see for instance Hofmeister and Borchert, 2004).

Despite these negative points, *PPP-Schweiz* works hard to promote PPPs in Switzerland. Indeed, many publications have been published in the recent years and continue to be published within the network of experts members of the association. Moreover, an annual meeting and several seminars organised by *PPP-Schweiz* give the opportunity to main actors, being potentially interested in PPPs, to meet, discuss and learn more about PPPs, in Switzerland as well as in foreign countries. The website of the association also offers the possibility to access experts and firms active in certain fields. They provide advice and help to plan and set up PPP projects in Switzerland.

3.2.2.2 PPPs in the Swiss Law, Political Speeches and Public Activities

A necessary condition for the development of PPPs in a country is the political will to promote such a mean for providing public utilities. In Switzerland, the absence of a common agreement across the public administration regarding the usefulness of PPPs is obvious. Therefore, different cases will be treated hereafter in order to illustrate the interest for PPPs shown by politicians and policymakers.

At the national level, a step has been made to promote the use of PPPs in the *Ordonnance sur les finances de la Confédération*. Indeed, it indicates that « in carrying out the tasks, the administrative units may examine rather the possibility to collaborate for a longer term, on a contractual basis, with private partners. »[15] Moreover, the article specifies that every detail must be settled by the Federal Finance Administration. Despite the fact that this article is vague and does not even give a definition about the actual collaboration, one can notice that PPPs entered in the Swiss law. That shows an increasing interest from the government's side, and that PPPs are becoming a real possibility to provide public utilities, beside more traditional procurements.

Concerning the SECO, one can notice that no PPP policy has been created there for Switzerland. However, the SECO is engaged in supporting different PPP projects across the world, merely in developing countries and in transition countries.[16] Thus, the SECO seems to have experience with PPPs and the different related contract models. Nevertheless, the differences between developing

[15] *Ordonnance sur les finances de la Confédération*, article 52a.

[16] For more information concerning the PPP projects supported by the SECO in developing countries, refer to SECO (2007).

countries and industrialised countries are so high that the experience of the SECO accumulated in this field would be hardly transferable to Switzerland.

It can finally be mentioned that policymakers in the Swiss Army are interested in using PPPs for several tasks. According to Baumann (2010, p. 82), chief of Armament in Switzerland and member of the association *PPP-Schweiz*, PPPs have been discussed in the army sector for a longer time than in other sectors due to « increasing operating costs and, at the same time, decreasing investments » (Baumann, 2010, p. 82, *translation*). Twelve service areas have already been identified as potential subjects to cooperation between the army and the private sector under PPP schemes, from simply conceptual projects like « clothes management » to highly complex infrastructure projects. Baumann (2010, p. 83) notices that theoretical and conceptual backgrounds are hence already available. However, concrete projects are still missing, even if a first PPP project has been launched in 2009 to create the *Offset-Büro* in Bern.[17]

The preceding examples illustrate that PPPs are more and more considered as a real possibility to provide public facilities in Switzerland. That insight slowly enters into the political and administrative speeches and, as will be shown in the next subsection, several studies concerning the feasibility of PPPs in precise sectors have been set up. However, the Swiss experience in terms of PPP remains scarce. Therefore, pilot projects should be set up in order to calculate the real gain of efficiency that may follow from PPPs.

3.2.3 Potential of PPPs in Switzerland: Which Sectors are Concerned?

In the previous paragraphs, I showed that, at the political level, the resort to PPPs is becoming more and more addressed, although there are still various difficulties and people to convince before PPPs can become established in Switzerland. In this subsection, the main fields in which PPPs seem to have the best chances to be developed are presented. It is mainly based on a basic study concerning PPPs in Switzerland, e.g. Bolz (2005). The author describes precisely the cases of public infrastructure, traffic, economic development and eGovernment, as well as of other fields like culture, education, sport, etc. The main conclusions concerning

[17] http://www.ppp-schweiz.ch (consulted the 2011-05-11).

public infrastructure and traffic will be shown in this section, as well as the results of one report concerning a PPP solution for rail traffic in Switzerland.

3.2.3.1 Potential of PPPs in the Public Building Construction Sector in Switzerland

This category contains the public buildings like administration infrastructures, schools, sport infrastructures (for instance football stadium), hospitals, conference centres, etc. According to Bolz (2005, p. 71), concerning infrastructure, the public sector heads more and more for private construction standards, which is an important condition in order to increase the collaboration between the government and private building firms. In this field, PPPs can be interesting because, as shown in the chapter 1, bundling the tasks of planning, building, financing and operating involves in certain cases more efficiency and then lowers the costs. However, it is important to notice here that the gain of efficiency in comparison with the traditional procurement would certainly be lower in Switzerland than in other countries. Indeed, as mentioned in the section 3.1, in Switzerland, the traditional way of building public facilities seems to be satisfactory and, because of lower costs of founding for public administration, cheaper than abroad.

Nevertheless, an important point mentioned by Bolz (2005, p. 76) is the potential of innovation resulting from PPPs. As the private partners have more leeway in a PPP than in a traditional procurement they can potentially provide higher incentives for innovative projects. However, as shown by Iossa and Martimort (2011),[18] caution must be exerted when the public sector seeks for an important innovation in public service provision. Indeed, uncertainty is then high and past experiences are missing, even though these factors are considered by Iossa and Martimort as being likely to involve the highest benefit from bundling the tasks (i.e. PPP). Therefore, the criterion of innovation must be taken with caution.

Despite this point, the potential for PPPs in public infrastructure seems to be important. In 2005, when Bolz (2005) completed the basic study concerning PPPs in Switzerland, he found only a few projects that could be seen as PPPs in the

[18] In this paper, Iossa and Martimort study the consequences of uncertainty at the implementation stage of a project on the design of compensation schemes. According to the authors, uncertainty affects the degree of contract incompleteness, and therefore the efficiency of PPPs.

public building construction sector.[19] Since then, new ones have been set up, as illustrated in the following example of the Burgdorf's prison (Canton of Bern):

> *Neumatt – Kantonales Verwaltunggszentrum Burgdorf* contains an administrative centre, an operation centre and a regional prison with 110 beds. This PPP follows an acquisition model, of which the contract was signed in 2009 for 25 years. The private partner Zeuhaus PPP AG won the competition between five consortiums to plan, build, finance and operate the asset. The amount of the construction's investment is about CHF 120 Mio and came from Zeuhaus PPP AG, while the government of Bern pays annual user fees of CHF 18.15 Mio.
> *Source: http://www.ppp-schweiz.ch*

3.2.3.2 Potential of PPPs in the Traffic Sector in Switzerland

This category contains road, rail and urban traffics. According to Bolz (2005, p. 78), there is no realistic example of PPP in this field, merely because the supply in this area is already satisfactory, and because the financing has not raised any major problems so far. However, since a few years, supply and financing problems appear and a consensus seems far to be found, for instance in the case of the so-called « third way » between Geneva and Lausanne. Another example is the maintenance costs of national roads, which recently led the Swiss government to consultation of a project to increase the price of the motorway vignette in order to cover the increasing costs. These examples illustrate the need to find new solutions in the field of transport in Switzerland.

Therefore, a PPP solution has been studied for rail traffic, following a wish from the Swiss Federal Office of Transport to analyse five possibilities for the future financing in Switzerland.[20] The authors concluded that PPPs are not compatible with the Swiss rail sector for the following reasons. First, they recommend rejecting *per se* any PPP project when the main goal is to alleviate the public budget *via* private founding. Indeed, according to the theoretical framework stressed in the chapter 1 of this paper, the choice of PPP instead of traditional procurement should not result from a wish to find private financing. The authors of the report notice that, in Switzerland, such behaviour would lead to

[19] For details about these projects, see Bolz (2005, pp. 335-346).
[20] A full version can be found on the website of the Swiss Federal Office of Transport (http://www.bav.admin.ch/dokumentation/publikationen/00568/00571/03059/ index.html?lang=fr, consulted the 2011-05-10).

avoid the debt brake mechanism and create wrong incentives, i.e. starting projects that will finally be more costly for the government.

According to the authors, the complexity of the Swiss traffic sector landscape makes the use of PPPs too complicated in rail traffic. The high number of required civil engineering, like bridges and tunnels, poses indeed an important problem for evaluating the quality of the infrastructure on the long term. Moreover, regulation is heavy in the rail sector in Switzerland. Consequently, the leeway within the operating period given to the potential private partners would be rather low. Therefore, according to the theory of PPPs, one can advise that conditions are not good enough to promote PPPs in rail traffic, and that hence more traditional procurement should be preferred. Furthermore, according to the authors of the reports, a gain of costs efficiency appears not to be realistic. Thus, PPPs seem definitely not to be a good solution for rail infrastructure in Switzerland.

Another interesting study realised for the Swiss Federal Office of Roads must be mentioned here.[21] Indeed, the ETH Zürich studied the feasibility of using PPP schemes to manage the operating of local roads in Switzerland. More precisely, the authors develop an aptitude test in order to evaluate the efficiency of different forms of PPPs. Therefore, the model is supposed to allow policymakers to directly compare their own costs with PPPs' solutions, and hence to highlight deficits and potential of gains in the maintenance of local roads sector. The aptitude test is roughly described hereafter.

The authors suggest using the Public Sector Comparator (PSC) to compare the costs of traditional procurement to maintain local roads with the costs of a PPP solution. The PSC evaluates the costs *via* a production function including the different tasks related to road maintenance, i.e. indirect costs like administration and operation centre and direct costs like winter services, cleaning, street lighting, technical services and green care. Costs related to each task are separated into four categories, i.e. staff, equipment, material and external services. Notice that the costs related to building infrastructure are also included in the indirect costs

[21] Bundesamt für Strassen (2008).

(administration and operation centre). The Net Present Value (NPV) of the PSC at date t_B is calculated as follow:

$$NPV_{t_B}^{PSC} = \sum_{t=1}^{n} \frac{C_t^{PSC}}{(1+q)^{(t-t_B)}} \tag{3.1}$$

where C_t^{PSC} is the cash-drain of the production function at time t.

The authors of the report offer several means to use the NPV of the PSC to compare PPP solution with the traditional one. It is not worth to detail all of these methods here. However, in order to give an example, the second alternative of the first economic comparison method is shown in the following.[22] In this variant, different kinds of possible efficiency for each local government are estimated and « lump sum » efficiency indexes are built. Then, a global efficiency index is found in order to approximate the potential cost savings of a PPP approach. This global index is:

$$\varepsilon_{T,Eff}^{PPP} = \varepsilon_P + \varepsilon_L + \varepsilon_R + \varepsilon_{RA} + \varepsilon_{SS} \quad [\%] \tag{3.2}$$

where ε_P is the process efficiency index, ε_L the life-cycle efficiency index, ε_R the risk sharing efficiency index, ε_{RA} the resources allocation index and ε_{SS} the scope of scale efficiency index. Therefore, the potential of saving in the costs NPV can be written as follow:

$$\Delta NPV_{t_B}^{PSC-PPP} \cong \varepsilon_{T,Eff}^{PPP} \cdot NPV_{t_B}^{PSC} \tag{3.3}$$

From (3.3), one can see that the NPV of the cost under traditional services and the theoretical cost of a PPP approach are directly compared and a positive result indicates the amount of cost savings that would occur with a PPP. This is only a part of the complete method offered in the report, but it illustrates the assumed process, i.e. calculating the actual costs and compare them with a PPP solution. However, it neglects to give more information about how these theoretical efficiency gains can be evaluated. Indeed, such information should be based on practical experiences and, according to the authors of the report, relevant experiences are still missing. Furthermore, the possibilities of concrete application in practice have not been studied deeply. Therefore, this report remains theoretic and, consequently, should be considered as that.

[22] The authors of the report study two complementary economic comparisons.

However, it illustrates the wish of the Swiss government to set up feasibility studies in Switzerland. This report is especially interesting in the sense that it is by way of exception devoted to more empirical and technical questions, while most of the studies concerning PPPs in Switzerland still focus rather on legal and institutional topics.

To sum up and conclude this chapter, the public infrastructure sector, e.g. administrative buildings, etc., seems to be more likely than the rail traffic sector to implement PPPs. According to Bolz (2005, pp. 83-95), sectors of economic development and promotion (as shown in the table 3.1 with the example of the Greater Zürich Area) and eGovernment have a huge potential in terms of PPPs. Nevertheless, as mentioned several times in this chapter, practical experiences are still missing. Thus, efficiency of PPPs in Switzerland remains up to now only theoretical. Therefore, PPP pilot projects must be implemented and then generalized, once they prove their efficiency. Moreover, theoretical analysis, similar to those roughly described previously, should be set up for each potential field where PPPs could be implemented in Switzerland. A few important steps have already been done, but the way is still long until Switzerland reaches other European countries in terms of PPP.

Conclusion

In this paper, I first attempted to put PPP into the scope of public procurement. Indeed, the first part of chapter 1 showed that PPPs are not similar to traditional procurement and privatization in several ways. In fact, PPPs are really based on a co-operation between the public sector and the private sector, whereas in the case of traditional procurement the responsibility of the whole project remains in the public hand, which is the opposite in the case of privatization. This co-operation involves different key points that have been theoretically analysed, i.e. the bundling of tasks, the risk sharing between the public sector and the private firm(s) and the private founding.

First, the main arguments in favour of bundling the tasks of building and operating the asset are the fact that it can lead to life-cycle cost savings and involve incentives for the builder (which is, in this case, also the operator) to ensure a better quality of the infrastructure. However, theoretical models shows that PPPs do not lead to these expected results in every case. Indeed, Hart (2003) finds out that in certain cases traditional procurement leads to less underinvestment than PPP, depending on the quality of which task can be specified. When the quality of the building phase can be well specified in the contract and the one of the service cannot, Hart recommends not resorting to PPP.

Other issues have been followed by searchers concerning the bundling of tasks in PPP schemes. For instance, Bennett and Iossa (2008) studied the effects of externalities and innovative incentives on the output. They showed that PPP does not involve more efficiency than traditional procurement every time. Nevertheless, the theoretical literature about the efficiency of PPPs is so broad that it was not possible to make a complete survey, due to a lack of time. Moreover, as PPP is a relatively new field of research, many issues have not been stressed yet, which offers the possibility for new models to be developed, based on the fundamental ones presented in this paper.

Furthermore, the model of Hart (2003) has been recently tested in the experimental economics field (see Hoppe *et al*., 2011). This study, which is to my knowledge unique, has been quite successful and the results confirmed the insights of Hart. Therefore, it seems that the econometric models concerning PPP

are likely to be an interesting basis for experimental studies. The interactions between the public and the private partners can indeed be simplified in order to set up such studies. Thus, it could be interesting in the future to test different theoretical issues in order to give more weight and credibility to their predictions.

Second, concerning the risk sharing argument, two main theoretical advantages can be highlighted. First, there is the fact that each risk being borne by the partner (public or private) best able to manage it involves less losses and a gain of efficiency. Second, in comparison with traditional procurement, the private sector has more incentives to provide a better quality and reduce costs when it bears a part of the risks. While it is quite obvious to know which sector should bear certain kind of risks (e.g. the political risk is more likely to be well managed by the public sector, whereas the private sector has more skills to manage the risks related to construction), other forms of risk involve different issues.

For instance, the demand risk is subject to several models that try to determine when the private firm(s) should bear it and when it should be borne by the public sector. In that respect, Iossa and Martimort (2008) stress that the demand risk is more likely to be borne by the private sector when it is quite low. Moreover, some studies focus on the effects of this demand risk sharing. Athias (2009) proves for example that the public responsiveness to consumers' concerns is higher when the demand risk is borne by the private sector.

Third, the private financing of PPP projects is also often suggested as being an advantage of PPPs. Indeed, that allows governments to provide expensive infrastructures that they could not afford with traditional public procurement. However, I showed that this argument must not be a reason to resort to PPP. Indeed, that involves what can be called a *financial illusion* that makes the budget of the public sector looking healthier than what it is in reality. A part of the literature is also devoted to the cost of financing, which is usually higher for the private sector. However, this issue has not been deeply treated in this paper. Nevertheless, with the recent financial crisis, using private founding in order to build public utilities has been more and more discussed. In respect with the theoretical framework concerning PPPs, such argument should be avoided

because they lead to wrong incentives. Indeed, the choice to resort to PPP must be undertaken *via* efficiency concerns and not rest on the fact that the public sector has to strong budget constraints.

In the second chapter, I showed that PPPs are getting more and more important in Europe. Indeed, after starting with PFI in the UK, other European countries like France, Germany or Spain started to turn toward the private sector to finance, build and operate public facilities. The emergence of the PPP market opens some attractive issues for the economists. Indeed, it could be interesting to study how PPPs have been developed in these countries, or how they have been spread from a country to another, as well as across regions inside a particular country. For instance, it would be worth searching if any *chameleon effect* can be observed. Different topics could be subject to such studies, like for example the form of the PPP contracts or the different way of sharing the risks.

In that respect, several empirical works have been introduced in the second part of chapter 2. The first thing that can be concluded from the studies presented in this paper is that they are related to many different sectors and issues. Indeed, there are a broad variety of concerns that have empirically analysed. Each of them lead to different result, sometimes in favour of PPP and sometimes in favour of traditional procurement.

As shown by Chong *et al.* (2006) concerning the water distribution in France, it seems that networks managed under PPP contracts involved higher prices than under traditional procurement. In contrast, the study of Roy and Yvrande-Billon (2007) concerning urban transport in France shows that PPPs achieved more technical efficiency than more traditional way of public provision. Therefore, the same conclusion than the one from the theoretical part can be done. Indeed, as already mentioned several times in this paper, PPPs are not more efficient than traditional procurement *per se* and each case must be carefully studied.

Despite the important number of empirical studies already set up concerning PPPs, plenty of questions remain open. The emergence of PPP in numerous countries offers more available data. Then, the efficiency of PPP, as well as other issues related to the determinants of PPPs and the characteristics of the contracts,

can be analysed in more sectors. Several empirical questions must be therefore cleared in order to help and guide policymakers in choosing the best way to provide public utilities, in terms of costs, quality and time delivery.

Finally, in the last chapter, the case study of Germany illustrated the importance of the legal and institutional frameworks for the development of PPPs in a country. Indeed, Task Forces and Centres of Excellence, as well as legal acts facilitating the implementation of PPP projects, have been created in Germany in order to promote the use of PPPs. The transition from traditional public procurement to PPP involves changes in the law and, therefore, the first step is to identify the hindrances met by public authorities during the different steps of a PPP project.

In that respect, Switzerland can learn from the German experience. Indeed, I show in the last part of this paper that the interest for PPP is increasing in Switzerland and that several stages have already been made. However, it remains numerous obstacles to get over in order to set up a real PPP policy in Switzerland. The literature on the subject already identified the main reasons explaining the Swiss lag concerning PPP, relatively to other countries. Therefore, it is now worth searching solutions to make up for this lost time. It must be mentioned that the studies concerning PPP in Switzerland mostly focus on legal issues, which is a necessary but not sufficient condition.

Indeed, the work realised until today deals with institutional and legal questions. It also identifies the potential of Switzerland concerning PPPs, i.e. in which sector PPPs have the more chances to be implemented. However, it misses real feasibility studies. The ones presented in this paper concerning the rail traffic sector and the maintenance of local roads in Switzerland are good examples of what should be done in order to clearly precise the potential of PPP.

In my opinion, a major issue concerning the implementation of PPP in Switzerland is related to which level of government is the most likely to resort to PPP. Indeed, the federal system of the country involves an important leeway for the cantons and thus each of them should develop its own PPP policy. The example of Germany can in that respect be followed, as several *Bundesland* created their own Task force. In fact, the economic and geographic frameworks

are highly different between cantons. Therefore, a unique national PPP policy and a centralized Centre of Competence, as it is actually the case with the association *PPP-Schweiz*, do not seem to be enough to fulfil the various needs of the cantons.

Moreover, the small size of most of the communes in Switzerland is another difficulties in the way of implementing PPP. Indeed, in order to benefit from economies of scale, a strong co-operation between local public authorities must be undertaken. However, this co-operation is already quite important and mergers between communes are getting more and more present in political wishes. Therefore, this *mergers trend* could be a good opportunity to implement PPP in Switzerland, as several public services would have to be reconsidered.

To conclude this paper, it is worth stressing that the field of PPP is broad and relatively new. The theoretical models as well as the empiric evidences already cover many issues related to the efficiency of PPP, compared to traditional procurement, and to the characteristics of PPP contracts. Nevertheless, several questions still remain open for upcoming researches in order to assess the pros and the cons of PPP. As mentioned above, PPPs have just been recently applied to experimental economics. This offers the opportunity to give more credit to the theoretical framework. In the future, it would be therefore interesting to test PPPs models with such experiments.

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