

**FINANCING PUBLIC INFRASTRUCTURE IN THE UNITED STATES  
AND FRANCE; A COMPARATIVE ANALYSIS AND POLICY  
RECOMMENDATIONS**

by

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**ABSTRACT**

Infrastructure financing in the United States and France has been marked by a long period of tranquillity in the second half of this century. The United States and France were relying on taxes and concessionary loans to local governments to finance public infrastructure; in the meanwhile, a few specific programs were developed in both countries, such as the US Interstate program and the French motorway program, to address particular needs. In the late 1970s, the sudden worldwide recession (provoked by the oil crises) and the increasing difficulties in raising taxes stopped the growth in infrastructure investment in France and the United States while the needs were still high. In France, this period was also characterized by decentralization laws and by deregulation of the French financial markets which transferred more responsibilities to the local governments while cutting off their source of concessionary loans. This combination of factors spurred the need, since the beginning of the 1980s, for new financing methods in France and the United States.

This thesis will first compare the current financing methods in France and the United States. Financing methods will be broken down into four categories--user fees, nonuser fees, debt financing, and private financing--which will be analyzed separately. Subsequently, recommendations will be developed to improve the current range of financing methods available to the French public powers. They will principally suggest the restoration of concessionary loans to local governments for infrastructure investment, a greater participation of the private sector, and the greater introduction of innovative financing methods. These recommendations will draw from existing American examples.

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# Chapter 1

## Introduction

### 1.1 General

The subject of this thesis is to describe and compare the ways the United States and France finance their public infrastructure needs. This subject is broad, as it requires an analysis of the administrative, legal, and fiscal system of both countries:

- \* the administrative system, because the public sector, through the central and other local governments, owns the largest share of public infrastructure capital in both countries;
- \* the legal system, because laws regulate the way those governments can borrow money from private investors; as we will see in this thesis, there are on this particular point significant differences between the United States and France;
- \* and lastly the fiscal system, because tax revenues are commonly used to finance, through grants and transfers, infrastructure investment.

This thesis will not restrict itself to a particular size of infrastructure projects. Small facilities (a small investment in a small municipality) as well as international projects will be examined. In each cases, the question will be: how is this infrastructure project financed? Because of the size of its subject, this thesis will not bring forth a comprehensive answer to the question of infrastructure financing. Many research teams in Washington and Paris have tried and are still trying to find out the optimal setup in the three areas outlined above-- administrative, legal and fiscal--to support infrastructure investment. The goal of this thesis

is rather to find out what the current practices are and what great areas of improvements exist. It will eventually try to submit policy proposals to improve the French infrastructure financing system.

There are many reasons that account for the usefulness of the subject of this thesis. The first of them is of course to find possible improvements in the French approach to infrastructure financing, in the way underlined above. A second one, almost as important, comes from the fact that in the last five years, researchers have shown a renewed interest in infrastructure as a means of improving prospects in economic growth. This stemmed from the historical paper of David Aschauer in 1989, which tried to relate infrastructure stock to productivity growth, and which set fire to a sustained reflection on this subject. In this respect, this thesis contributes to this series of papers by trying to answer the question: how to pay for the increase in the infrastructure stock?

Let us first clear up the meaning of “infrastructure” in the context of this thesis. In the following pages, the word “infrastructure” will not be defined by the dualism public/private (“infrastructure” being publicly owned, and some other word like “equipment” privately owned). Regardless of who owns it, “infrastructure” will designate either roads, bridges, mass transportation, airports, ports and waterways, water supply, and wastewater treatment facilities. This thesis will in fact rarely focus on a particular type of infrastructure (roads, or mass transportation for instance), but rather on a type of investment. The examples used will be selected according to the particular interest of their financing setup, not according to their nature. In certain cases, however, I will underline specific types of infrastructure

which have been advantageously financed in a particular way, like the case of highways in France and in the United States.

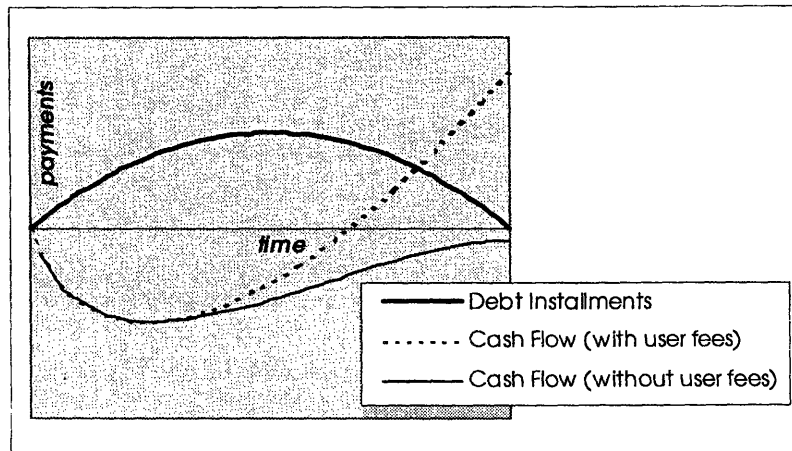
Three sources of information have been used to carry out this research: interviews, in France and in the United States, of local governments officials, public servants, private investors, and project managers; readings (references in the text and the bibliography); and data research to obtain the various figures that are used all along the text.

## **1.2 The Specificity of Infrastructure Financing**

Infrastructure financing is different from other type of projects' financing because it bears larger and more complicated risks. This is a strong argument for the necessity of having a large array of financial and legal tools for infrastructure financing. Indeed, infrastructure offer a long and risky amortization period, a very large time lag between the beginning of the investment and the start of financial returns, high sunk costs and amount of invested money, and a high uncertainty in the users' level of utilization during the active life of the infrastructure project. Infrastructure project risks are often characterized in three categories: financial (market risks), construction (cost overruns and unexpected incidents during the construction period), and operation (users' level of utilization).

This thesis will put a great emphasis on the financial aspect of infrastructure project management. The financial puzzle that infrastructure owners have to solve is well represented by the following curves.





The hardest impediment to infrastructure financing occurs in the second half of the project construction period, when the project does not yet generate any revenues, and when the financing costs are simultaneously high. This observation is the basis for modern infrastructure financing, and new methods of coping with it have been developed at increasing pace recently. Such methods were often based on the idea of financing infrastructure from private funds, which was later characterized as “privatizing infrastructure”. In this field, France and the United States have been recognized as forerunners: the former because of its experience in highway financing through a “Build-Operate-Transfer” model since the 1960s, the latter because of its habit, since the independence days, of developing small local infrastructure financed through user fees (bridges,...). This idea of infrastructure privatization has become very attractive during the recent past because of the cuts in public funds which were traditionally used for infrastructure construction and which are now used to other ends (medical and social care, education...). As we will see, a complete spectrum of financing methods is now available, ranging from “all-public”, as a new road construction financed through central government

transfers and local taxes, to “all-private”, illustrated by the new achievements of the “Project Finance” technique such as the Channel Tunnel.

However, it is becoming progressively clear that the possibilities offered by the “infrastructure privatization” are not endless. In very recent projects, like the French “TGV Est” (latest high speed train track going East from Paris, to Strasbourg and later on Germany), private intervention was eventually totally dismissed because it would have required the project to show a higher rate of profitability and hence it would have asked for a large governmental subsidy. It will be shown in chapter 3 that the rationale for the government to undertake the project was based on the social rate of return of the project, which was higher than the financial rate of return because of important externalities (regarding land use and European integration). After a decade of privatizing experiments, will the 1990s bring back the classical infrastructure financing scheme, consisting of a large use of public funds? This is a legitimate question, for which elements of answer will also be found in this thesis.

## **Chapter 2**

### **Current Methods of Financing Public Infrastructure in the United States and France**

#### **2.1 Who Owns the Infrastructure?**

##### ***2.1.1 In France***

The French administrative system has experienced two revolutions in the past fifteen years. The first one, at the end of the 1970s, was the creation of the regions as a new local government level. The second one, in 1982, consisted in the voting of the decentralization laws. These laws consisted in the transfer of responsibilities from the national to the local level (regions, départements, municipalities and local authorities, over 50,000 as a whole), such as the ownership of the stock of local public infrastructure.

Today, the stock of infrastructure belongs principally to this group of local governments. The infrastructure spending at the local level was equal to 9.4 percent of the GNP in 1994. It increased from its level of 7.3 percent of the GNP in 1970 (Bonnaque, 1994). The local governments spent FF. 170 billion in 1994 to capital outlays financing, corresponding to 12.5 percent of the nation's total. This amount corresponded to 70 percent of the total investment from the public sector. Finally, between 1984 and 1991 and because of the new duties of the local governments, the increase in investment has been significant: from FF. 91.8 billion to FF. 170 billion (in current FF.).

The previous figures show the prominent role of the French local governments in the construction and maintenance of the nation's infrastructure. This observation explains that

a significant part of this thesis will be spent in investigations upon local governments ways of financing infrastructure.

Public infrastructure, as established above, is principally managed at the local level.

However, besides local infrastructure, France has recently carried out some very important investments at the national level. Four of these will be introduced in this thesis: the motorway program, Eurotunnel, the TGV, and Orlyval. The first one, that of the toll based motorway program, has been successfully achieved by France in the past 30 years. The most remarkable aspects of this program are detailed below.

#### **A Case of National Infrastructure Financing: the French Motorway Program**

The French motorway system was borne during the late 1960s. Its financing relied, from the beginning, upon user fees (toll system), although it did not exactly correspond to a case of project financing (section 2.3). This particular financing made possible the construction of 5,500 km of highway (as of December 1990), representing a total investment of about FF. 150 billion of construction cost, if the system were to be rebuilt today (Berthier, 1991). In spite of the bankruptcy of three of the private concessionary companies created, the French highway program has appropriately been considered to be a success, because it provided the French territory with an expanded network of highways, at a time when tax money wouldn't have been sufficient to finance it.

In the first years of the program, concessions were made to five parastatals created for this purpose. The capital of these companies was on average totally insignificant, running from FF. 5,000 to FF. 500,000 (Berthier, 1991). These companies financed the construction of the first highways with active support from the French government. In

particular, governmental aid came in the form of financial back-up (to help the companies in the case of momentary deficit), loan guarantees, and contributions in kind (right-of-way, existing roads, ...). The revenues collected from the tolls were to reimburse the loans and governmental aid. The existence of this aid actually made the financing of the French highway program distinct from the project financing technique (section 2.3). Specifically,

loans were not guaranteed by the project expected revenues, but instead by the government. The very small amount of capital of the concessionary companies made this government guarantee imperative. A public entity, the “Caisse Nationale des Autoroutes” (CNA), was created along with the four concessionary companies. Its role was to raise money on the French and foreign bond markets on behalf of the companies. Until 1980, it benefited from the government’s guarantee. Since then, the guarantee only applied to bonds issued on foreign markets, which enabled the CNA to obtain the highest ratings.

Bonds issued on the French market have not been guaranteed from the government since 1980, which demonstrates the quality of CNA’s borrowing. It can be noted that with their total debt amounting in millions of francs, and their capital of only a few thousand francs, the highway parastatals should almost have immediately been placed in a situation of bankruptcy. To solve this accounting problem, special practices were adopted in the companies’ financial reports. This is to show that the highway parastatals were in fact mostly designed as an efficient, albeit a bit awkward, way for the government to raise private funds in the markets.

The second and critical step for the motorway program occurred after ten years of its existence, in 1969, with the opening of motorway concessions to the private sector. A tendering process was launched so that privately owned companies could enter the

program. They would be selected upon the soundness of their financial setup. The concept of B.O.T (Build-Operate-Transfer) was born. Four companies were approved and granted 30 to 40-year concessions. After ten years, three of those companies came to experience difficult financial situations, because of the two oil crisis of the 1970s which had multiplied by two the highway construction costs, and had caused a reduction in automobile traffic. Those three had to call for the government's guarantee on their loans. In response, the government had them taken over by the existing concessionary parastatals. One private company managed to survive these difficult times: Cofiroute. Cofiroute had been awarded the concession of 462 km of highway in 1970, for a duration of 35 years. The expected construction cost was FF. 1.976 billion.

The financing plan proposed in Cofiroute's bid for the contract was:

Type of funds	million 1970 FF.	Percent total
Capital	170	8.5%
Escrow account	65	3.2%
Revenues from project execution	133	6.6%
Government's contributions in kind <sup>1</sup>	195	9.7%
Unguaranteed loans	280	14.0%
Government guaranteed loans	1,160	57.9%
<b>Total</b>	<b>2,003</b>	<b>100.0%</b>

*Source: French Ministry of Public Works*

The plan shows a capital amount accounting for 8.5 percent of the total investment, and 60 percent of unguaranteed loans, a major difference with the first concessionary companies which had so-to-speak no capital, and needed a government guarantee for all

<sup>1</sup> The government's contribution, corresponding to FF. 10 million of land, and FF. 185 million of roads, was to be reimbursed in semi-annuals installments over 10 years, starting 15 years after the beginning of the construction.

of their loans. This financing plan for Cofiroute's first concession marked a step in the government's goal to transfer highway financing from the public to the private sector. Since then the share of guaranteed loan over the total loan has further reduced.

Cofiroute, only private concessionary company since 1983, has been awarded five new B.O.T. contracts between 1977 and 1990. It never called for the government's guarantee on its loans. It has now become a very profitable company.

### ***2.1.2 In the United States***

The United States presents the same situation as France with respect to its public infrastructure: the 83,000 local governments manage and maintain 70 percent of the United States' public works. States and local governments also contribute to the amount of 75 percent of total public spending for public works (OTA, 1990).

The following table highlights the respective parts of federal and local governments in infrastructure spending:

Year	<i>Federal</i>			<i>State and Local</i>		
	Capital	Operations and Maintenance	Total	Capital	Operations and Maintenance	Total
1960	28	3	31	36	33	69
1970	23	5	28	37	35	72
1975	22	6	28	31	41	72
1980	25	7	32	23	45	68
1985	22	5	27	21	52	73
1987	19	5	24	24	52	76

(Source: "Rebuilding the Foundations", OTA, 1990)

The share of infrastructure capital ownership is also known from a study of the Bureau of Economic Analysis in 1991 (Gramlich, 1994). This study shows that the nonmilitary

infrastructure stock is estimated to be worth \$2,034 billion, of which 88 percent (\$1,791 billion) is owned by state and local governments, and the rest by the federal government.

Once again, as for the case of France, this brief review shows that infrastructure investment is much more a local government issue than a federal issue. This is contradictory to the widespread idea that the federal government is the principal provider of infrastructure. However, through transfers (in particular from the Highway and the Airport and Airways Trust Funds), the federal government is nevertheless a very important actor in infrastructure financing and we it will be a major subject in our analysis.

## **2.2 How is the Infrastructure Currently Paid for?**

There are four major ways of financing infrastructure: debt financing, nonuser fees (including all sorts of non-dedicated taxes, grants and transfers), user fees (including tolls and dedicated taxes), and private financing. A fifth financing source has also been identified: special benefit fees (AASHTO, 1987), corresponding to the fees that are charged to those who benefit from new infrastructure, without necessarily using them, like project developers. This kind of financing can be characterized as part of the nonuser fees category. As for private financing, the particular case of completely private infrastructure projects will be reviewed in the next section, project finance.

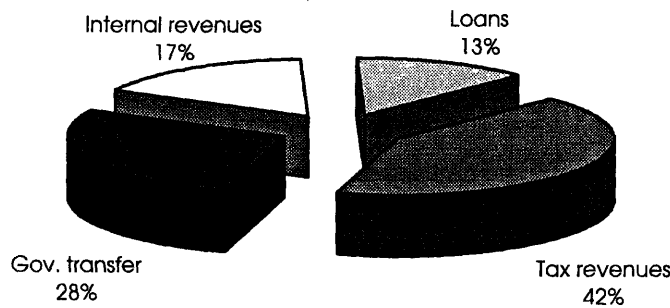
This classification under four categories applies to France and the United States. It is worth noting that user fees include the gas tax, which is heavier in France as we will see, and that nonuser fees include central government's subsidies to local governments.



## 2.2.1 In France

### (i) User Fees

The following chart shows the structure of revenues for the local governments in France, in 1992 (see comparable chart for the United States in 1.2.2):



*Source: Blanc, 1993*

User fees, except for the motor vehicle tax (which is included in “Tax revenues”), is a small part of local governments revenue, and is included in “Internal revenues”. Contrary to the United States, French infrastructure are seldom financed through direct user fees, except for the motorways, which are under the responsibility of the central government. And only recently did a law authorize local governments to collect tolls directly.

The motor vehicle tax, which represents 0.23 percent of the nation’s GNP, (America’s motor vehicle tax is 0.21 percent of GNP), is not dedicated to highway construction, neither to any type of infrastructure construction. It is in fact mostly used to meet the cost of the welfare system. The excise tax on fuel, the gas tax, is very heavy in France. It amounts to 7 percent of the total tax revenues in France (without social security), whereas the gas tax amounts to 2 percent of the total tax revenues in the United States. The

French gas tax is not dedicated to road construction, or more broadly infrastructure construction, either.

**(ii) Nonuser Fees**

Nonuser fees correspond to taxes, collected at the local or central level, and all kind of transfers that are made by the public power to help finance infrastructure. French new taxes, whatever the level at which they apply (national, departmental or municipal) must be voted by the Parliament (Constitution, Art. 34). An example of innovative tax to finance infrastructure construction was made during the preparation of the 1992 winter Olympic games in France (Albertville). This tax, active from 1986 to the games, was set up to pay for the cost of new road works (a highway was constructed and many upgradings of existing roads were made). This tax was applicable on any new construction in the département of Savoie, where the games took place.

At the local level, a choice is offered to legislators to set up a special benefit fee to help finance infrastructure. This special tax is to be payable by the developers, and can range between one percent to five percent of the value of any new construction. This tax is to be used for the small public infrastructure (local roads, sewerage systems...) that are made necessary after new constructions have been carried out in a municipality. However, developers often resist paying this fee, and this accounts for the small number of cases where it has been established. This case is similar in the United States, where this tax also exists and is enforced in some states.

Lastly, the central government takes from its own tax revenues to redistribute them to local governments, by means of transfers. In 1993, the transfers total amount to be used

for capital investment was equal to FF. 39 billion, out of FF. 200 billion of investment from the local governments. This is to be compared with the share of trust fund grants in the United States as percentage of federal and local outlays, which is approximately the same: 20 percent (see 2.2.2). The governmental transfers to local governments are based on a complex computation. It was set in place in 1983 to substitute case by case subsidies, and to enable local governments to forecast their annual investment budgets.

An important example of mixed user-nonuser fees financing (through passenger revenues and government initial investment) is given by the construction of the TGV Est. This example is described in details below.

#### **Financing the TGV (French High Speed Train)<sup>2</sup>**

Although public-private partnerships have been celebrated for the past few years as a solution to the shortage of funds in infrastructure financing, the example of the TGV Est financing shows that government transfers may in some cases offer a better alternative.

The first TGV, going from Paris to Lyon, was financed thoroughly under the management of SNCF, the French rail monopoly parastatal, with funds raised in the capital markets (SNCF bond issues). It was chosen for its rate of return, the highest among all possible TGV projects, equal to 15 percent, and its social and economic rate of return, above 25 percent. The second TGV project, going South-West from Paris, was subsidized up to the amount of 30 percent by the government in order to make the project viable.

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<sup>2</sup> From interviews with the staff of the French Ministry of Public Works

Today, because of the heavy indebtedness of the SNCF (more than FF. 180 billion outstanding debt), the company can only accept projects having a significant financial return. However, the latest project, the TGV Est, going from Paris to Strasbourg and Germany, was approved for political reasons (related to the construction of Europe), away from any project's profitability rationale. This project showed a rate of return between 3 and 4 percent, well below the 8 or 9 percent minimum that SNCF is likely to accept. It amounted to a FF. 25 billion investment to pay for the rolling stock and rails construction. To finance it, the possibility of a private-public venture was analyzed. Under this solution, the rate of return would have to have been raised to an acceptable level for private investors. To raise the rate of return to 8 percent, an estimated FF. 13 billion would have been needed from the government. But to be attractive to private funds, the rate of return would have needed to be above a minimum of 15 percent, therefore requesting from the government a subsidy even superior to the previous FF. 13 billion.

This example demonstrated to the public powers that public-private funding sometimes created the need for huge public subsidies to turn an infrastructure project into an attractive private project. For this reason, the idea of setting up a public-private partnership for the TGV Est project was ultimately dismissed. However, because the political commitment to build the project was strong, it was decided to finance the project under public funds only, coming from different sources: the central government, local governments, Europe, and SNCF.

### (iii) Debt financing

Following the administrative reforms of the beginning of the 1980s (section 2.1.1), the laws regulating debt financing of local governments were abrogated in 1986. Before this date, local governments could borrow under a very beneficial rate, using the proceeds of a national savings program ("Livret A"). After this date, they had no special advantage over other borrowing institutions. As a compensation, they were authorized to borrow almost freely from the financial markets, and to issue bonds. The last remaining restriction applying to local governments' debt financing was that the proceeds of the debt would not be used to finance a deficit in their operating budget.

Therefore, from 1986 on, local governments have had to learn how to find funds from banks and capital markets. They are now acting as American local governments except for two differences: (i) French local governments' bond issues do not offer any advantage over other bond issues, such as tax-exemption; (ii) French local governments still dislike issuing bonds directly on the markets, and rather borrow from financing institutions (banks, other institutional investors...). In 1991, only 1.7 percent of local governments' debt financing has been made through bond issues, 98.3 percent through banks and other institutions. Among those institutions, one is granted approximately half of the market: the Crédit local de France (CLF). Its market share of local government loans ranges between 40 and 50 percent annually. In 1993, it lent FF. 36.8 billion to local governments. This institution, which is authorized by law to lend to local governments only, was privatized in 1993, and its bond issues (used to finance its loans for local governments) are granted the top Aaa rating by Moody's. It borrows the largest part of

its funds on international markets, noticeably in the Eurobond market where it is the seventh largest borrower.

The disintermediation (i.e. the direct local government intervention on the financial markets), such as what currently exists in the United States, will take long to come, if ever, in France. This is due to history, the size of local governments' borrowing needs, and the lack of credit rating among local governments (only ten were rated in 1993). As underlined by one of CLF's director (in Euromoney, June 1993), only 25 local government entities are in a position to go to the market independently.

Since the beginning of the 1990's, an increase in the amount of bond issues by local governments was noticed. Borrowing independently in the financial markets could for some time be explained by a kind of a snob effect, as local governments wanted to demonstrate to their constituency that they were "grown-ups". In 1993, many of them tried to borrow directly on the markets, leading to a volume of FF. 8 billion, a level unprecedented so far, but still very small compared to the \$291 billion raised in 1993 by the American local governments on the markets (source: AGEFI, Dec. 15, 1994). In 1994 however, very few local governments borrowed in the markets, only the city of Paris, the region surrounding Paris, and some nearby départements, because of worse market conditions (Les Echos, Jul. 7, 1994).

#### **(iv) Private Financing**

Private financing of infrastructure projects can take many forms. Private financing came from the necessity for the public power to overcome a more and more acute shortage of public funds. For some cases, the use of private funds was the only way to accelerate the

construction of a project. In the case of Eurotunnel, for instance, the British government had announced that it would not give one penny for the achievement of such project. Without private financing, this project would have been delayed *sine die*, once again. Private financing can mean that: (i) a significant share of the project financing is borrowed from private investors, with or without a government guarantee on the project; or (ii) some of the project risks (construction or operation risks) have been transferred to a private party. In addition to the fully privately financed project, which will be reviewed in section 2.3, there are basically five type of private interventions for infrastructure construction in France, the first of which being the only one specifically French: (i) the *Sociétés d'économie mixte* (SEM), public companies run with public and private funds, (ii) leasing agreements, (iii) throughput agreements, (iv) renting ("affermage"), and (v) concession (B.O.T.) models.

The SEM are used by local governments needing private funds to carry out specific tasks.

Between 50 and 80 percent of the SEM's capital must belong to the local government,

making the SEM a public company. The remainder belongs to private investors. Those

companies are not automatically granted the local government's guarantee on their loans,

although it is often the case. This enables them to borrow at a lower cost. They are used

by local governments to take care of small projects. They are very attractive to local

governments, and quite less for the private investors, because the latter cannot get a

majority of the capital, and because SEMs are most of the time only barely profitable.

Leasing is, for regulatory reasons that we will analyze in section 2.5, not very much

developed in France. Under this setting, the project is financed by private funds and

thereafter leased to the public authority. During the leasing agreement, the project is owned by those who financed it. At the end of the leasing agreement, the public authority can buy back the project by paying a sum agreed upon at the signing of the agreement. This financing method is in particular used for the purchase of equipment such as trains, by the SNCF.

Throughput agreement is close to leasing except that more risk is borne by the public authority. In this case, the public authorities let those who financed the project operate it during a specific period of time. During this time, the public authorities pay a lease for the project, also committing itself to pay them in advance in the case the project revenues were lower than expected.

Renting ("affermage") corresponds to the case where the project is financed by the public authority, and then operated during a specific number of years by a private company.

Throughout the renting contract, this company usually has to give back excessive profits made out of the project to the public authority. At the end of the contract, the company transfers the infrastructure, in satisfactory conditions, to the public authority. This kind of agreement has been widely used for the construction of equipment in the French ski resorts, and also to finance capital intensive projects such as water networks, at a time public funds were more readily available.

Lastly, Build-Operate-Transfer contracts, or concessions contracts, are the most frequent kind of public-private partnership. In this case, the project is financed and built by private investors, following the technical specifications of the public powers. It is operated during a specific number of years and then transferred back (without compensation) to the public



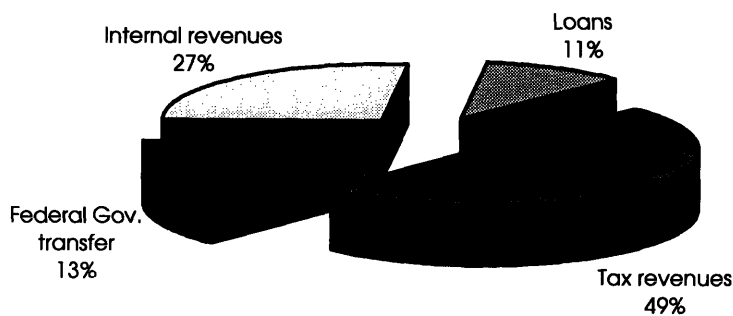
powers. This method has been used for the projects financed through the project finance technique (see section 2.3).

### ***2.2.2 In the United States***

From the mid 1970s, the investment in new infrastructure and the maintenance of the existing one have kept declining (Gramlich, 1994). This was the result of two combined effects: a decrease in local tax revenues and a drastic drop in the amount of federal subsidies. We will see this, and how the governments reacted, by increasing user fees and other type of taxes, more in detail now.

#### **(i) User Fees**

The structure of revenues for state and local governments in the United States was in 1990:



*Source: Facts and Figures on Government Finance, The Tax Foundation, 1993 edition*

It can be derived from a comparison of this graph with that of France (section 2.2.1) that:

(i) the tax revenues at the local level are more important in the United States than in France (49 Vs. 42 percent), showing that the United States have a more decentralized administration than France (as one would expect); (ii) the sum of internal revenues and loans (reciprocally the sum of taxes and central government transfers) is bigger

(reciprocally smaller) in the United States than in France, showing that user fees, debt and private financing are more widely used in the United States than France; (iii) however, it would seem that loans themselves are less used in the United States than in France (11 Vs. 13 percent). This must be mitigated by the fact that local budgets are on average larger in the United States (still because of a greater decentralization). The local debt proves in fact to be higher if we calculate it per capita:

Country	Long-term debt issued by state and local gov. in 1990	Population	Debt issued/capita
<i>United States</i>	\$109 billion	250 million	\$435
<i>France</i>	\$11 billion	56 million	\$195

*From Blanc, 1993 and Facts & Figures on Government Finance, 1993*

At the national level, the structure of public revenues in France and the United States is highlighted in the following table:

Revenue Item	US (billion \$)	in % GNP	France (billion FF.)	in % GNP
Total tax revenues	1,723	29.42%	3,054	43.63%
Social Security	516	8.81%	1,362	19.46%
Total (without Social Security)	1,207	20.61%	1,692	24.17%
Excise tax on Fuel	23	0.39%	118	1.69%
(State and Local) Motor Vehicle Tax	12	0.21%	16	0.23%
(State and Local) Amusement Tax	1	0.02%	10	0.14%

*from "Revenue Statistics of OECD Countries, 1965-1993", OECD*

This table confirms the fact that the gas tax, the motor vehicle tax (and the amusement tax although this is of less importance) are heavier in France than in the United States. In the past twenty years, state and local governments in the United States have tried to find additional sources of revenue. The development of state lotteries, generating amusement taxes, came out of this process (Blanc, 1993). The number of tolled facilities also soared in response to the higher budget pressure of local governments. There were 36 toll road systems operated by 28 states in 1990 (Commonwealth of Virginia, 1990), in comparison

with a handful in the beginning of the 1970s (see the example of the forthcoming Dulles Greenway in Virginia, section 2.3).

**(ii) Nonuser Fees**

The revenues from property taxes (still the main source of revenue for local governments) have been stopped in many local jurisdictions out of a process which began in 1978. By 1985, local jurisdictions in 33 states faced limits on the taxes they could levy on local property-owners (Munnell, 1990). California's Proposition 13 (voted June 6, 1978) and Massachusetts' Proposition 2 ½ are the best known of a series of laws which were aimed at restraining the power of jurisdictions to raise property tax levels. In 1987 though, property taxes still generated over 70 percent of the tax revenue collected by all local governments. User fees, sales, income, dedicated taxes, federal and state aid, and private sector investment provided the remainder.

The federal government is assigned, from the Constitution, the role of ensuring interstate commerce (Article 1, section 8.c). It has therefore naturally supported the funding of public works infrastructure, particularly for transportation (highway program for instance) and water resources. However, because of the increasing debt service, rising cost of healthcare, welfare and retirement programs, federal support for infrastructure began to decline in the late 70s. The Carter and Reagan administrations progressively reduced the amount of federal subsidies. From 1979 to 1989, federal grants to states and local governments fell from 11 percent to 5 percent of the total federal expenditure (OTA, 1990). As a result, the effort in infrastructure investment as a percent of GNP declined steadily in the United States over the 80s: United States federal public spending on

infrastructure investment went from 5 percent of total federal outlays in the 60s to 2.5 percent in the 1980s (OTA, 1990). The same phenomenon occurred in Europe, where investment in transport infrastructure went from 1.5 percent GNP in the 70s to 0.9 percent in the 80s.

This drop in infrastructure investment eventually fostered a series of “needs” studies from the beginning of the 1980s. (Infrastructure policies for the 90s, OECD). The estimated needs for infrastructure investment is huge. It has been appraised by the US Congressional Budget Office to be \$800 billion from now to the year 2000. Europe has also estimated the cost of upgrading transport, communication and energy networks to be 100 to 110 billion ECU per year in the same period (one ECU = \$1.3). This need for huge investments comes at a time when public revenues are low and needed for new purposes, such as welfare and education.

Those “needs surveys” typically concluded that massive public investment were needed to bring up national infrastructure to a certain standard or to maintain them at their current level. These studies were not however a very useful tool, to the extent that each of them was based on arbitrary targets. They were nevertheless useful to highlight a problem of underspending in public infrastructure.

The federal government’s aid to local government’s spending in infrastructure takes principally two forms: (i) an indirect form, which is that of the tax-deductibility of municipal bonds; and (ii) a direct form, grants. The first mechanism is crucial for it allows local bonds to offer a rate lower than that of other bonds, and is the principal reason why

local bonds are so broadly used. It will be examined later in this chapter. The case of grants is examined thereunder.

### **Grants and Trusts funds**

Federal government grants can be of three kinds: unattached to any particular purpose (State and Local Federal Assistance Act, 1972), for a particular sector or program (social care, interstate highways 1956), and for a particular project (trust funds). The total amount of these transfers ranges from \$120 to \$150 billion a year, corresponding to 13 percent of the total states and local governments revenues in 1990.

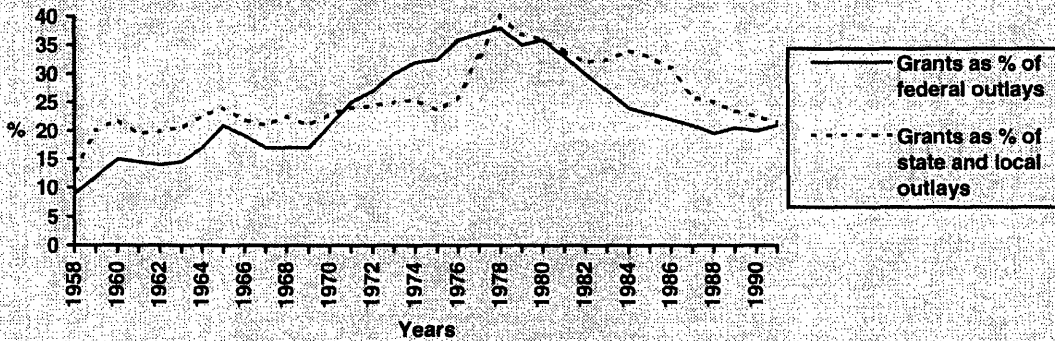
The largest trust fund is the Highway Trust Fund. It was created by Congress in 1956 to finance the large interstate highway system, and was kept active since then. It is funded by numerous excise taxes, related to transportation, the most significant of them being the gas tax. For projects that qualify for grants under the highway program, the federal government provides between 75 and 90 percent of the total cost. Highways built with the support of this trust fund must be free of tolls (this rule has changed recently, see section 2.5).

The second trust fund is the Airport and Airways Trust Fund, established in 1970 and financed by excise taxes on passenger ticket sales, freight charges and aircraft fuel. The matching percentages for airport capital construction ranges from 75 percent for the largest airports to 90 percent for the other, and vary by type of project.

The following figure shows the share of federal grants as percent of state and local outlays. It indicates that whereas federal grants still represent approximately 15 percent of

state and local revenues, they have been cut in half since the end of the 1970s.

**Federal capital grants as a percentage of state and local capital expenditures and federal capital expenditures in the United States**



*Source: Infrastructure policies for the 90s, OECD*

The specific figures of trust funds grants are given by the following table.

**Federal Public Works Trust Funds, 1988 (million \$)**

Trust Fund	Revenues	Outlays	Balance (End of Year)
Highway Trust Fund	15,306	14,732	14,187
Airport and Airway Trust Fund	4,081	2,896	5,841
Inland Waterway Trust Fund	102	59	315
Harbor Maintenance Trust Fund	161	169	8

*Source Office of Management and Budget, 1990.*

One of the lessons of this table is the surprising balance of remaining funds at the end of year 1988. This can be explained by the rules regulating the trust funds that will be discussed later on in this thesis.

### **(iii) Debt financing: the American Municipal Bond Market**

Financing permanent capital outlays is often carried out by the municipalities through the use of bonds. The purpose of those long term bonds is simple: to smooth out user fee or tax revenues and to distribute them over the life of the project. Two broad classes of long term municipal bonds are available: general obligation bonds and revenue bonds. General obligation bonds are backed by general tax revenues, and therefore bear smaller risks than revenue bonds which have a more limited backing: the revenues generated from a specific project. Examples of large authorities which have been financed with revenue bonds are the Massachusetts Turnpike Authority, the Massachusetts Port Authority and the Washington Public Power Supply System (WPPSS).

If it turns out that the revenues collected from the project are lower than expected, the bonds can be defaulted. There have been numerous cases of default with revenue bonds in the United States, one of the most famous being that of WPPSS for an amount of \$2.25 billion in 1983. Only a very few such cases have happened in France because of the lower utilization of municipal bonds (only one municipality has faced a situation of possible bankruptcy: Angoulême, in 1990). Other things being equal, revenue bonds offer a higher rate than general obligation bonds to compensate for the higher risk of default. At the same time, revenue bonds are also more appealing to issuers because they avoid using tax revenues and are paid with the revenues directly generated by the project.

The key interest of municipal bonds is their tax exemption. In order to be eligible for tax exemption, a bond must meet the requirements of Section 103 of the Internal Revenue

Code, tightened recently by the Tax Reform Act of 1986<sup>3</sup>. Before the Tax Reform Act of 1986, the increasing number of tax-exempt bonds, especially industrial development bonds (“private-activity” bonds), had had two effects: (i) indirectly, the federal taxpayer was subsidizing private activities in a way never intended by the American Congress, and (ii) the competition coming out of the greater number of tax-exempt bonds was driving the interest rates of all public purpose bonds up. The Tax Reform Act of 1986 made many of the private-activity bonds ineligible for tax exemption. It maintained the other municipal bonds, in particular those for infrastructure investment, eligible.

Tax-exemption of municipal bonds enables them to have a lower yield than US Treasury bonds. Let  $t$  be the income tax rate,  $R_m$  the yield on a municipal bond, and  $R_t$  the yield on an equivalent taxable bond (same maturity and risk), then, if  $I$  is a sum to be invested, we have:

$$I + I.R_m = I + I.R_t - t.I.R_t$$

so:  $R_m = R_t.(1 - t)$

Tax-exemption of American municipal bonds is a major difference between the French and American infrastructure financing systems. It gives the American municipalities the opportunity to bypass their shortage of funds by using private funds available in the

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<sup>3</sup> Section 103 of the I.R.C. reads as follows:  
 (a) Exclusions: Except as provided in subsection (b), gross income does not include interest on any State or local bond.  
 (b) Exceptions: Subsection (a) shall not apply to:  
 (1) Private activity bond which is not a qualified bond: any private activity bond which is not a qualified bond (within the meaning of section 141).  
 (2) Arbitrage bond: any arbitrage bond (within the meaning of section 148).  
 (3) Bond not in registered form, etc.: any bond unless such bond meets the applicable requirements of section 149.  
 (c) Definitions: For purposes of this section and part IV  
 (1) State or local bond: the term “State or local bond” means an obligation of a State or political subdivision thereof.  
 (2) State: the term “State” includes the District of Columbia and any possession of the United States.



markets at low cost. French municipalities do not have this possibility, and can borrow funds on the markets with no particular advantage over other institutions. We can try to estimate the average spread between French and American municipal bond rates. The exact rates at which the CLF lends money to local governments are confidential. However, we can take these rates to be 0.3 to 0.4 percent higher than the current French Treasury Bonds<sup>4</sup>. This made these rates approximately equal to 7.9 percent in the beginning of 1995, for 20-year maturity loans. Also in March 1995, the United States, the municipal bond yield average was equal to 6.25 percent (ranging from 6.05 percent for a Aaa bond, to 6.95 percent for a Baa bond) (Source: Moody's Bond Survey, March 27, 1995). In March 1995, therefore, the spread between French and American municipal bonds was ranging from 1 to 2 percent. This difference, along with the fact that tax-deductible bonds are the cheapest way for American local governments to raise money in the markets, explains the higher use of debt financing in the United States compared with France.

**(iv) Private Financing**

Private intervention in the United States takes the same form as in France (section 2.2.1). It is however possible to note a difference in the relationship between the public and private partners in the American context. The private investor is generally less constrained in the United States than in France. An example is given by the private water supply companies. In France, local water supply networks usually belong to the public sector,

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<sup>4</sup> From an interview with one of the CLF research staff.

even during the concession contract period, and water tariffs are fixed beforehand (price cap regulation), almost regardless of what it incurs for the private company in terms of profitability. In the United States, local water supply networks belong to the private company, and water tariffs are fixed in order to give the private company a return on investment determined in the concession contract (rate of return regulation). These additional constraints that have to be borne by French private investors are perceived as supplementary risks by them (section 2.4). This can induce the investor to expect higher rate of returns from its investment, and consequently to charge the public sector higher financing costs to carry out the project.

A recent and completely new phenomenon occurred recently in the United States regarding the participation of the private sector in infrastructure financing: the idea of privatizing existing projects. It partially came out of a study conducted in 1990 by the Reason Foundation, which concluded that a sale of the 50 largest airports in the United States could raise \$24 billion for local governments (Aviation Daily, December 19, 1991). Massachusetts' Governor William Weld for instance considered the feasibility of selling both the Massachusetts Turnpike Authority and Boston Logan Airport. It was estimated that Logan Airport could sell for \$400 million. Similarly, the city of Los Angeles analyzed the possible sale of its five airports, including LAX. The proceeds of the sale of LAX Airport could amount up to one billion dollars (Aviation Daily, December 19, 1991). Those considerations (none has actually been implemented yet) haven't so far been echoed in France.

### **2.3 The Special Case of Project Finance**

Project finance is a very attractive method for projects that have a sufficient rate of return, and we will in particular examine two projects that have been financed through it: the Dulles Greenway, in the United States, and Orlyval, in France. It was first introduced in the 50s, for ventures for which the loans could not be guaranteed. The basic idea of the project finance technique is to offer the project's assets and revenues themselves as guarantee for the loans. In the eyes of the public powers, this technique is very interesting in that it enables them to carry out new projects without taking one cent to taxpayers, as the French Ministry of Transportation noted in his speech for the signing of the concession contract to Orlyval (see below).

There have been until now only a few attempts to use project finance for infrastructure projects. This comes from the particularity of infrastructure projects generally not to have high rates of return. Therefore for most projects, the revenues cannot repay for the debt interests. This is the reason why the infrastructure projects must sometimes be subsidized or given some kind of support to entice the project holders. Without this support, there would be a lack of finance for low-profitability infrastructure projects. The United Kingdom, extremely liberal, and which has recently developed a policy of "not one public penny for highway or rail projects", is a living example of this fact: this country is currently suffering a bigger and bigger shortage of infrastructure development.

### ***2.3.1 Sharing the Project Risks***

In traditional financing, investors (banks, financial markets...) lend to a project managing company, which commits its entire resources to repay the loan whatever happens to the project. In project financing, investors associate themselves with the project managing company and accept to share the project risks. If the project turns bad, investors have no recourse against the company (see the Orlyval case for example). More refined project financing agreements can include some amendments to this entirely “non-recourse” arrangement: many agreements provide that investors share the operating risks, but not the technical risks, i.e. the company is financially accountable in case of technical failure.

Besides the country risks (revolution...or foreign exchange rates, which are moderate in the United States and France), and the developer’s risks (the seriousness of the developer), the project’s risks themselves are made of two principal components: the construction risk and the operating risk. The construction risk comes from the possibility for the project not to be ever finished, or to cost a lot higher than initially forecasted. Since the investors’ only chance of being repaid comes from the cash flow generated by the project once completed, they are generally very sensitive to the construction risk. The operating risk corresponds first of all to the ability of the project developer to operate the project once it is completed, and second of all to the volume risk, i.e. to the risk that the project could be under-used by potential customers. In spite of all the existing traffic models, and of the safety margins applied by the investors, the operating risk remains high

and very hard to apprehend. As a result, the traffic forecasts of Orlyval (see below) were wrong enough to cause the bankruptcy of this project.

### ***2.3.2 Two Examples (American and French) of Project Finance***

#### **(i) The Dulles Greenway**

An example of current infrastructure project being built in the United States using the project finance approach is the Dulles Greenway. The Dulles Greenway is a 14-mile northwest extension of the Dulles Toll Road, connecting Washington Dulles International Airport and Leesburg in the northern Virginia suburbs of Washington, D.C. This project is seen as a major breakthrough for privately funded highway projects in the United States, and we will use it as an example for the current evolution in the regulations of such projects later on in this thesis (section 2.5).

It is one of the first highways of its kind in the United States, and the first private toll road in Virginia since 1816. The Toll Road Corporation of Virginia (TRCV), developer of the project, was granted by the State Corporation Commission a franchise of 42½ years to build and operate the highway. It will then be transferred to the state. TRCV has secured over \$300 million in private funding for the project. The works, which began in September 1993, are expected to take two and a half years and are currently ahead of schedule. The estimated cost of the project amounts to \$326 million, of which \$258 million are financed through long-term fixed rate notes with an exceptional average maturity of 30 years. A pool of banks has agreed to provide \$40 million dollars as a revolving credit facility, and the remainder of the funds comes from the equity stock of the

Toll Road Corporation. Once completed, the toll road will be operated by Autostrade International Virginia, an American affiliate of Autostrade International S.p.A., which manages over 2,000 miles of toll roads in Italy.

**(ii) Orlyval**

Orlyval gives an example of a complete failure of an infrastructure project financed with the project finance technique. In 1986, a tendering process was launched for projects aiming at reducing the car traffic going from Paris to Orly airport, one of the two airports serving the French capital city. Two candidates came forth: the SNCF (national railroad monopoly) with a classical commuter train project, financially supported by Spie Batignolles (a major contractor) and Cofiroute (see section 2.1), and Matra company (a major defense and transportation company), promoting its latest technology, the VAL, a fully automated light subway system. The concession contract was awarded to the second bidding team, in April 1988, for a 30-year period. The Orlyval company was created to carry out the project, with an equity stock of FF. 200 million, shared among Air Inter, the French domestic airlines, (26.7 percent), Lyonnaise des eaux, a major contractor, (18 percent), Matra Group company, (17.3 percent), RATP, Paris urban transportation authority, (3.3 percent), and banks (Indosuez, Crédit Local de France--see section 2.2--, BNP), (34.7 percent). The project cost was FF. 1.75 billion and FF. 1.55 billion were financed through bank loans.

The Orlyval system was inaugurated in October 1991. The first months of use showed that the passenger's use forecasts had been extremely optimistic. After one year of

service, 1.5 million passengers had taken Orlyval instead of the 4.3 million expected. In December 1992, the Orlyval company could not repay for its debt capital and interests. It was declared bankrupt. After one month of negotiations, the banks agreed to give up one billion FF. of their loans, and the shareholders FF. 90 million. The Orlyval system was transferred to the management of RATP, for the outstanding duration of the concession contract (25 years), on the condition that it would give to the banks all the net operating revenues collected from this system (estimated FF. 300 million during the whole 25 years).

The reasons for the failure of the Orlyval system are twofold: political and technical. First, the project had been selected mostly on political grounds. The Matra Group needed a showcase for its VAL system. In this respect, the link between Paris and Orly was an unequaled opportunity, because it would carry international travelers, and be located in the suburbs of the French capital city. Matra Group therefore consistently lobbied to get the concession contract. In this context, they took into account a very optimistic number of passengers in the prediction of their cash flow. In an infrastructure project financed with the project finance technique, the Orlyval case confirmed that the forecasts of passenger's use was crucial to the success of a project, as passengers are generally the only source of revenue of the project (see above, operating risk). Decision makers have to be extremely cautious with the models that are used to predict the traffic. When building its first TGV, for instance, SNCF benefited from a century of experience with railroad operation, and still decided to opt for very conservative forecasts.

Second, the Orlyval project included technical mistakes, such as the necessity for passengers to first take a commuter train to get nearer Orly's airport, at the Orlyval's departure station, and then take Orlyval. This connection, located in one of Paris' unfriendly suburb station, discouraged many passengers from using the Orlyval system. Once again, this mistake was made because of a poor project analysis, since the project supporters were mostly concerned with the idea of having the VAL system in Paris, and hadn't cared much about the chances of success of it in the particular environment of the Paris-Orly link.

## **2.4 Risk Allocation and Comparison of Costs**

### ***2.4.1 Risk Allocation***

Risks in infrastructure financing are real. They are critical in this type of projects because of their huge costs, the long time period between the start of capital formation and the start of financial returns, and because of the high uncertainty in the users' level of utilization of the projects. Of course, talking of risks is only relevant in the case of an infrastructure project of which the financing scheme relies partially or fully on expected revenues such as tolls. In such cases, the risks can be borne by the public sector, possible private investors which would have co-financed the project, and the public if bonds have been issued.

Having the risks shared by the public is somewhat specific to the United States, through the use of general obligation and revenue bonds. Instances of defaults have occurred on



these bonds, mainly on the revenue bonds (Fortune, 1991). However, the risks taken by bond holders can be mitigated by the use of a insurance company (see below). This practice is now well established in the United States, and has just been introduced in France.

As for the case of France, the resort to debt financing for infrastructure project has generally led to government guaranteed bonds. This was true in particular for its motorway construction program. And as we have seen in section 2.1, the government's guarantee on bonds was called for in the case of three out of the four private concessionary companies. The only cases of infrastructure financing where risks have been taken by the public can be found in cases of the holding of equity stock. In the Orlyval example, for instance, stock holders<sup>5</sup> agreed to resell the Orlyval stock for FF. 60 making a loss of FF. 90 per stock in comparison of its initial value (FF. 150). Since 1986, only a few bonds have been issued by French local governments on the markets which involved risk for the public who purchase them. The greater part of debt financing was carried out through specialized institutions (section 2.2.1).

Besides the share of risk borne by the public itself, through bond or equity ownership, the risk associated with an infrastructure project is divided between the public and the private entities involved. Some cases of public-private partnerships in France are in fact quite ambiguous as far as who really bears the project's risk. Such cases include the situation

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<sup>5</sup> One million stocks had been issued, for FF. 150 million.

where a private party owns an infrastructure project and leases it to a public party until this one has entirely paid for it. Theoretically, the private party could fall back on this project as a guarantee, in case of the public party's sudden default to pay. However, the private investor involved in the leasing agreement bears more risk than it may appear at first glance: in view of the French laws forbidding the disruption of a public service, it is likely that the courts wouldn't let the private party seize the infrastructure project in case of a default to pay. So far, such situation of default on a leasing agreement between public and private parties in France has not occurred yet, and the kind of legal precedent it will create will be critical for the future of public-private leasing agreements.

At the crossroads between risk allocation and the cost of a financing scheme are the rating agencies. The practice is on this point very different between France and the United States. Rating agencies analyze the risk of a given bond issue, and grant it with a grade which reflects the risk inherent within in the bond (the Dulles Greenway \$258 million notes have for instance been rated BBB by Fitch Investors Service). Almost all the local governments' bond issues are rated by Moody's or Standard's and Poor's in the United States, whereas a handful of them has ever been rated in France (approximately ten). Risk analysis in France is actually carried out by the CLF, for its own use, and does not refer to specific bond issues but to local governments in general. A grade from 0 to 100 is given to local governments, based on the government's tax and other type of revenues, the flexibility of the government's budget, and other variables such as the population. Unfortunately this rating is not public. In the United States and France, it seems anyhow

that local government's rating is not a very reliable indicator. The recent history of both countries has shown that a local government could suddenly default without anyone expecting it (Orange county in the United States, city of Angoulême in France), and reciprocally, that a local government could well survive in spite of the worst ratings and predictions for its future (city of Brides in France, heavily indebted after the Olympic games of 1992).

To overcome the penalty of having a bad rating or no rating at all in the case of French local governments, a technique has developed in the United States, and has recently been implemented in France: the use of an insurer to provide a guarantee on a bond issue. Two American monoline insurers, Financial Security Assurance and Municipal Bond Investors Assurance, have already been hired for a few bond issues in France. Bonds guaranteed by them were granted a AAA rating, thereby reducing the interest rate of the local governments' bond issues.

#### ***2.4.2 Comparison of Costs***

The comparison between the costs of the various financing methods can be made from two different standpoints: that of the user of the infrastructure project, (i.e. how much does the infrastructure cost the user to use?), and that of the nation as a whole, (i.e. does such or such financing method incur greater construction costs, or greater financing costs?).

From the user's standpoint, tolls or any kind of user fees are the most unfavorable solution. Economically, user fees are yet a very sound solution to the extent that, through them, the users pay directly for the cost incurred by their use of the infrastructure. A fundamental question about user fees is to determine their exact level, and as we can see, there is on this particular subject much controversy over what is currently being done: the fact that current levels of user fees do not reflect the real cost of building and maintaining infrastructure projects is almost unchallenged (see Winston, in Munnell, 1990). Levels in the United States are too low to what they ought to be, especially for trucks, and user fees in France are not dedicated to infrastructure spending (the motor registration tax and the gas tax are mostly used for other purposes than infrastructure investment). However, although the users will rather have the infrastructure paid by general taxes, some cases of infrastructure projects exist, that were financed by user taxes with the support of the public itself: an example of this is the \$2 million Fargo-Moorehead bridge (North Dakota), opened in 1988, which is tolled because voters had rejected to finance it through general taxes (Munnell, 1990, p. 147). Interestingly though, this bridge suffered a very low utilization, and the financing plan went bankrupt less than two years after its opening.

From the standpoint of the society as a whole, two questions may arise at this point: are there some differences in the construction and the maintenance costs induced by the choice of a particular financing method, and are there also higher financing costs for some methods? The example of the Dulles Greenway is a good example that can be used to answer to these questions (Commonwealth of Virginia, 1990, and Munnell, 1990, pp. 156-

9). Two competing proposals were submitted in 1990 to construct and operate the Dulles-Leesburg planned extension: the first one, designed by private investors (TRCV), amounted to \$199 million, and asked for a \$1.5 toll per car during the first years of the project, and the second one, coming from the Virginia Department of Transportation, amounted to \$236 million, and asked for a one dollar toll per car during the project's life. On the one hand, the cheapest proposal (in terms of construction costs) between the two came from the private sector. The \$37 million difference could be explained in large part from the fact that TRCV expected that it would get much of the right-of-way for free. And as TRCV was granted the project later on, it indeed obtained a third of the necessary right-of-way through donations. On the other hand, the higher toll fees for the private project came from higher financing costs (TRCV, unlike VDOT, could not issue tax-exempt bonds), and from the necessity to make some profit out of the project (in part to provide dividends to TRCV shareholders).

The previous example shows that for intrinsically profitable projects, and in competitive conditions (or otherwise governmentally regulated conditions), privately managed projects can benefit the nation as a whole by costing less. However, it also shows by the comparison between the two proposed toll rates (one and a half dollar versus one dollar) that financing costs can be higher when projects are privately financed.

## **2.5 Regulatory Issues**

We will now characterize the body of regulations that condition infrastructure financing in France and in the United States and the major issues that surround it. The cases of both

countries will be examined sequentially. As in section 2.2, financing methods will be clustered into user fees, nonuser fees, debt financing, and private participation (including the case of full privatization, i.e. project finance). Of course, analyzing the case of France will be simpler to the extent that it is not a federation of states, and that the same laws are enforced throughout the country. Regarding the United States, we will examine the evolution of federal regulations and highlight some specific state regulations, when appropriate.

### ***2.5.1 In France***

French gas tax is levied by the central government, and the vehicle registration taxes are levied by local governments. As we have seen, the level of these taxes is not correlated to the needs of infrastructure financing but to other needs, such as welfare, so that we won't elaborate more on them in the context of this study. Conversely, the regulations of toll fares brings about interesting lessons. The by-law of 1970 introducing the concessions of highways to private companies provided that the toll levels could be fixed by the concessionary companies themselves. In 1975, however, a new by-law provided that the toll levels would have to be approved by the government. Later, in 1988, the approval of the highway toll levels by the government was confirmed in a broader decree, which also provided that the government could impose a lower fare, should an exceptional situation arise or a conspicuous wrongdoing from the companies be observed. This tightening of the government control over the concessionary companies, after the concession contracts were signed, has been seen by the private investors as a sign of the fragility of their

situation vis-à-vis the government. In exchange to this tighter control, concessionary companies have often asked, and obtained, an increase to their concession periods.

Nonuser fees in France are composed of a vast array of small local and national taxes. Government transfers, based upon these taxes, depend on numerous criteria. Local government councils most often do not fully understand the basis of such and such transfer, and in some cases hire consultants to try to get the most out of the system. This complex setting often misleads the legislators themselves. The city of Brides, for instance, is currently in trial with the French Treasury which claims that 17.8 percent of the FF. 80 million the city invested for the 1992 Olympics are due as for the value added tax (V.A.T.) liability. The city claims that this tax was deductible in the particular context of the games and thus constituted a indirect grant from the government. It appears that the city might win the case, but this shows that the legal framework regulating transfers is nevertheless much too complex in this country.

Debt financing has undergone the most drastic evolution in the last ten years in France. From the 1982 decentralization laws, the local governments have the almost complete liberty to borrow some funds (note for instance the difference with the referenda requirements effective in most American states described below). The only regulations concerning a bond issue are based on the total amount of the issue and are surprisingly loose: for amounts lower than FF. 500 million, the emission is free; for amounts ranging from FF. 500 million and one billion Francs, the issue must be announced to the stock exchange's issue committee; for amounts above one billion Francs, the issue must be

carried out through a bank, with a schedule approved by this issue committee. However, French local governments do not have any kind of legal advantages to borrow funds, as there can be for the American local governments with tax-exemption. The cost of debt financing the French local governments will bear will therefore be based on their credit history. In this respect, two points often prevent the local governments to take advantage of better debt financing costs: (i) the lack of credit rating in France (see section 2.4), and (ii) the specificity of public accounting in France, which is for private investors a source of great apprehension. Public accounting is indeed not suited at all for the design of credit quality indicators, and is rarely understood from private investors. Because of this, many of them often decline to lend money to local governments (which by the way explains the strong position of specialized institutions such as the CLF).

Lastly, let's examine private financing in France. This relates to public-private partnership. Indeed, fully private financing of infrastructure have occurred on a case-by-case basis, as the motorway program, Eurotunnel (regulated by an international treaty), or Orlyval. We have seen above how the relations between the public and private sectors are equivocal as regards the pricing of user fees. Let us now look at another case, the regulation of leasing: leasing of infrastructure projects by private investors to public entities is regulated by an article of the law of December 30, 1986 (in the nation's appropriation law for 1987). This article which enabled local governments to resort to leasing to finance their infrastructure actually extends a practice that was used for the construction of energy saving facilities. It requires that: (i) the leasing company be an



existing “Sofergie” (company financing energy saving projects), and that (ii) the infrastructure project generate revenues subject to the value added tax. Those conditions are as we see very constraining. Private investors cannot in fact offer a leasing service to local governments (except for Sofergies), and local governments can use leasing financing only for V.A.T. creating infrastructure. Because of this, leasing agreements to finance infrastructure haven’t developed much in France.

### ***2.5.2 In the United States***

User taxes in the United States have mostly been based on gas tax and vehicle registration tax. Although tolled facilities are not new in the United States (the Pennsylvania turnpike was completed in 1940, and many other tolled facilities were built in the 19th century), their expansion was greatly hampered by the implementation of the Interstate highway system program, which started in 1956. The program set out the construction of 42,000 miles of new highway, 90 percent financed by the federal government; in turn, tolls were forbidden on the highways (except for 2,000 existing miles of tolled highway on the East coast that were incorporated into the program). The program cost was met with the federal excise taxes on fuel and vehicles for the federal share, and with the states’ gas taxes for their share of the cost. The interstate program remained the only highway financing patterns until recently, when the federal budget and also states budget pressure became too important. California, for instance, finally had a doubling of its gas tax approved by its voters, after it had not been raised for many years.

There have been some federal and state actions in the 1980s to withdraw from this overuse of fuel and vehicle taxes. In 1987, the Congress relaxed its ban on federal financial support of publicly owned toll highways (note that this only regards public highways). It authorized seven demonstration toll road projects in 1987, and two more in 1988. Federal grants amounting up to 35 percent of the cost of the highway could be claimed to help meet the toll expected revenues. Colorado, California, Pennsylvania, Delaware, and Georgia offered to participate in this first series of tests. Lastly, in 1991, the Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA), which allowed states to commingle gas tax and toll revenues, and encouraged public/private partnerships.

If we look at the case of airports, a similar evolution has taken place recently. Airports can now apply for a grant from the Airport and Airways Trust Fund while imposing a passenger ticket fee. This “passenger facility charge” (PFC) must be approved by the Federal Aviation Administration. The new Denver International Airport for instance decided on a \$3 ticket fee, and should receive \$436 million in federal grants, for a total project cost estimated at \$3.75 billion (including financing costs) (source: Series 1992C and 1992D bond issue for DIA airport, information report).

Generally speaking, and compared to France, there are in the United States many regulations restricting state and local infrastructure finance. State constitutions and statutes limit the capacity of states and local governments to finance public works; they also limit state and local spending, taxing and borrowing powers, prescribe interest rate

limits and referenda requirements, and impose conditions on privatization. Voting requirements are an example of such constraining regulations. The need to have the people approve by vote most of the bond issues or tax proposals has been identified as the principal constraint on expanding infrastructure investment by public officials (Munnell, 1990, p. 125). This is a striking difference with France where public decisions so-to-speak never need public approval. Among the consequences of the voting requirements is the fact that local governments often wait for their infrastructure stock to show obvious signs of repair needs or of undersupply before acting. Only when infrastructure is obviously underfunded can they be indeed sure that their proposition will be approved by voters (Munnell, 1990, p. 120). Many states have such provision of a required majority approval for a bond issue or a tax raise. Even more stringent are states like California, Massachusetts, or Washington where two-thirds of the ballots are needed to pass a bond initiative or a tax increase. To overturn this political power of voters in respect to tax-supported infrastructure, public officials can create special authorities outside of their public structure. An example of such setting can be found in the Commonwealth of Massachusetts. Massachusetts Industrial Finance Authority (MIFA) was established in 1978. It is an independent agency raising private capital. Its bonds are not backed by any state guarantee, and it receives no state funds. From 1978 to 1990, it has completed \$5.7 billion in the financing of more than 2,450 projects. In 1989, the Legislature expanded MIFA's mandate to serve as the state's public sector investment bank, allowing cities, towns and municipal bodies to issue tax-exempt bonds through the agency. In 1990, for

instance, MIFA approved a request of the Massachusetts Turnpike Authority for \$47 million in tax-exempt bonds to fund overdue emergency repairs on the Sumner and Callahan Tunnels linking downtown Boston to Logan Airport.

State legislatures have become more open to private financing in the last few years. In 1989, California passed a law allowing to build up to four privately funded toll roads. Washington state also selected in 1994 six proposals in a program to test private financing of transportation infrastructure, that were made possible from a law enacted in 1993. Those projects were selected from 14 proposals worth \$4.8 billion. The Dulles Greenway (section 2.3) is also an example of such opening of infrastructure financing to the private sector. It is interesting to notice that there will be no public subsidies for any of those projects; on the other hand, some states will not regulate and indeed let free the tolls and rates of return of those privately funded projects. California seems to be among those states. As for Virginia, the 1988 Highway Corporation Act enabling the Dulles Greenway project specified that the State Corporation Commission would regulate the tolls and profits made by this project.

## **Chapter 3**

### **Assessment of the Current Financing Methods for Public Infrastructure**

#### **3.1 What is the Rationale to Select a Particular Method?**

In this section, we will try to uncover what could be the rationale to select a particular financing method. The next section (section 3.2) will be dedicated to determining whether a selected financing method can be deemed, in retrospect, successful, by the application of criteria of performance.

At first sight, it appears difficult to find a clear rationale, applied by the United States and France in the past, for the selection of a method to finance their infrastructure. Indeed, any possible rationale seems to be heavily affected by one country's past history and current behavior. Let's take two examples, the United States Interstate program, which dramatically impacted on highway financing from 1956 to the 1980s, and the French highway financing at the same period, based on user fees. During those two programs, the financing of highways had been agreed upon once for all in both countries, and no one really thought, for each new highway project, about the reasons why it should be financed up to 90 percent by the federal government in the first case, and through toll revenues in the second case.

This apparent difficulty to find a common rationale for both countries can in fact be overcome and we will show that the American and the French arguments to select a financing method is indeed based on the same principles, which are derived from the microeconomic theory. The difficulty that is mentioned above is nothing but the distortion that is caused by the country's specific institutions. What is more, there has been recently a visible homogenization between the financing methods available in the two countries: as we have seen in chapter 2, in the last decade, the United States have become much better disposed towards the use of tolls, and France has repealed almost all the administrative constraints affecting debt financing by local governments, making this solution much more attractive.

The United States and France justification for selecting a financing method is based upon three sets of considerations: the fairness, the impact, and the feasibility of the financing method. We will now explain those and review them in the particular light of the American and French setting. At the end of this analysis, we will try to uncover the rationale that could lead to use private partnership to finance infrastructure.

### ***3.1.1 Fairness***

The argument on "fairness", or on "equity", corresponds to the fact that the funding must be borne equally by those who use the infrastructure. It does not mean that everyone should be equally burdened by the cost of the infrastructure, but rather that each user should pay for the infrastructure in proportion to his or her demand. This should be true between the different users, across the land, and among successive generations.

When selecting a financing method for infrastructure, the owners of the project should first base their selection on this fairness argument. One could argue however that only the user fees entirely meet this fairness requirement. Indeed without the other arguments under consideration below (impact and feasibility), user fees would almost ever be preferred to nonuser fees, or to debt financing (whether from public or private funds).

The equity argument can be used to review the general rationale for federal infrastructure transfers (rationale of “benefit spillovers”). This rationale states that if an infrastructure investment was only carried out by a local jurisdiction, it would lead to an underestimation of the needs because citizens from outside this jurisdiction also benefit from the investment that is made, and therefore have to pay for their own use of the infrastructure. In this respect, a study has been made by Edward Gramlich (in Munnell, 1990) for the case of capital invested to improve an existing highway (enlargement, ...) in a given state. He assessed that 70 percent of the benefits of this investment are made by those living inside the state. Therefore, “fairness” would suggest that the proper federal matching grant should amount to 30 percent of the project’s costs, whereas it totals 80 to 90 percent today. What is even worse, federal grants are often capped. The consequence is that they do not fulfill their role of being an incentive at the margin, but instead are used to pay almost entirely (90 percent) a too small (because grants are capped) infrastructure.

On the first hand, user fees appear indeed optimal in a number of situations, with regard to fairness. This is the case when parallel infrastructure projects, offering different level of services, are proposed to the user. Instances of this are given by highways which are built

close to another existing road (such as the Dulles Greenway with respect to route 7 in Virginia, or other existing tolled Turnpikes). In these cases, users of these infrastructure projects will generally pay a direct fee to cover their construction and maintenance costs of this infrastructure, so that those who do not use them, and stay on the lower service infrastructure, be not charged for facilities they do not use.

On the other hand, the additional financing methods still comply very well with the fairness requirement in other cases, and particularly when externalities of the projects are high. In such cases, nonuser fees can legitimately be used to finance an infrastructure project. For instance, property taxes can be used for projects significantly increasing the value of the neighboring land.

As a practice case for this fairness condition, we can analyze the funding of the Interstate Highway Program. A major share (90 percent) of the cost of this program was supported by the federal government, while the rest (10 percent) was provided by states and local governments. Most of this money came from the proceeds of the user tax, such as the gas tax. To judge if this financing system was equitable, we have to consider two questions: was the program accessible to the people all over the nation, and did it benefit all the people in proportion to their share of the cost (i.e. their contribution to the gas tax)? The first question arises out of the fact that the funding for the program came from federal money, and should therefore be distributed equally over the whole nation. The answer to this question is actually positive, since the Interstate highway network expanded almost evenly across the fifty states. The answer to the second question, on the contrary, is



negative: as noticed in Friedlaender (1965), “the person who never uses the Federal-Aid System will effectively subsidize a person who predominantly uses it”. Still from Friedlaender (1965), we can deduce that the Interstate system carried, in the 1960s, 17 percent of the nation’s traffic while accounting for 66 percent of the federal user taxes, whereas the other federally supported systems carried 45 percent of the nation’s traffic while being granted 37 percent of the federal user taxes. This demonstrates that the drivers on the other highways were strongly subsidizing the users of the Interstate System. In conclusion, this brief analysis of the Interstate System has given us an illustration of a deficient application of the fairness argument, application which proves to be only followed in so far as it does not go against political will.

### ***3.1.2 Impact***

In choosing the financing method, planners must take into account its potential effect on the success of the projected infrastructure and the development of the surrounding region. The “impact” argument requires that the financing plan do not place too big an additional burden on the users of the infrastructure which could hamper the level of utilization of the project and also slow down the development of the region.

Whether in France or in the United States, this concern about impact leads to the resort to nonuser fees (mostly general taxes), because tax money is the major recourse available to local governments, and using it to the purpose of infrastructure construction is indifferent to the taxpayer as long as no tax increase is involved. This consideration would actually be more accurate in France than in the United States. In the former country indeed, the

use of general funds by local governments is very seldom a subject of controversy for the citizens. As a consequence, there has been only one case of referendum in the past ten years in France (in the city of Grenoble, about whether to build a streetcar public transportation system), to help a local government decide between investment options, whereas referenda are commonly used in the United States.

The impact of the proposed financing method can be measured by comparing the internal rate of return with the social and economic rate of return of the project. The former gives an indication of how financially self-sustainable the project is, and the latter indicates how desirable the project is from the perspective of the public. If the internal rate of return is small, it means that asking the users of the infrastructure to bear its entire cost would have on them a impact out of proportion with the benefit they get from it. If the social and economic rate of return is large, it means that the infrastructure is highly desirable, (sometimes for reasons other than purely economic, such as land use, general welfare...). This type of assessment is often done in France. It was the case, as we have seen, for the high speed rail program for which both rates of return were computed for each planned route. When the first rate of return is low and the second high, using nonuser fees, even if it does not fully meet the fairness argument, is justified. This is why some large projects in France, such as the TGV, which have a high social return, and would have a very negative economic impact on the people because of their high cost if the people were to be the only contributors, are subsidized with general taxes.

### ***3.1.3 Feasibility***

Last, the financing method must finally be analyzed under the perspective of feasibility.

This point is crucial, for all type of financing, whether based on user or nonuser fees, and private financing. In considering whether the infrastructure could be repaid by user fees, the pattern of projected revenue flows is of foremost importance. For projects that should be financed by nonuser fees, such as general taxes, the feasibility question requires that the consequences of sudden fund cuts in the financing be assessed before launching the project.

Under the feasibility question, the infrastructure owners should also address whether debt financing could be used for their project. Debt financing, associated with user or nonuser fees, enable the owners to bridge the gap between the huge cost and the low revenues that characterize the beginning of an infrastructure project. The major difference between France and the United States regarding the access to debt financing for local governments have already been underlined above (disintermediation in the United States versus institutional investors such as the CLF in France). This difference results in the need of a much more meticulous preparation for American local governments. Indeed, they must select underwriters and decide whether to seek a bond rating or a credit enhancement (guarantee...), and have the responsibility of many decisions such as the type of debt to be issued and its duration, whereas French local governments rely on an institutional investor to be their advisor in any of these issues.

Lastly, two specific remarks should be made regarding the resort to user fees:

- (i) While analyzing the feasibility of user fee financing, the infrastructure owner should be aware that such kind of financing is not always possible: collecting user fees, or assessing their exact value can involve a significant amount of money. For this reason, water supply was maintained free of user charge and paid through local taxes in some moderately urbanized regions of France until a decade ago, because the cost of installing water meters was more expensive than the projected revenues this would have induced. Similarly, on highways, user fees have often to be forgone because of the prohibitive cost of installing and maintaining a toll plaza.
- (ii) In the case of a road construction financed through tolls, the traffic estimation is crucial. As stated by Jacques Guerber, one of the CLF's directors ("Le Monde", May 17, 1994): "if the forecast is realized, then the project should be quite successful; if the actual use is around 70 percent of the forecast, then it should be possible to reimburse the bank loans, but not to make profits; if the actual use is below 50 percent of the forecast, then the project is heading towards a complete failure". The case of Orlyval gave us a perfect illustration of how realistic this warning could be.

### ***3.1.4 Public Vs. Private Financing***

Two different kinds of considerations determine the choice between public or private financing of infrastructure in the United States or France. The first one is economic, the second one political.

Undoubtedly, when private financing of some projected infrastructure passes the three principles above (fairness, impact and feasibility), it provides the project owner with a very favorable solution. In a period of tight public budgets for the United States and France, private funding enables to finance infrastructure that would not be undertaken otherwise. The most important economic question linked with choice between public and private funding lies in fact in the determination of which one, between public or private infrastructure management, is more cost-efficient. This question applies equally to the construction and operating phases of a project. As for the construction phase, a distinction between France and the United States can be made, specifically regarding the power of eminent domain. The power of eminent domain, granted to the public sector, indeed appears to be more efficient in the French than in the American system. Therefore, the French public powers are in many cases better adapted to the construction of large projects, which require the acquisition of an important right-of-way, like the new high speed rail program. In the United States, the lessons of the recent privately funded SR 91 in California and Dulles Greenway in Virginia tend to show that the private sector is very efficient in buying the required right-of-way for the project, therefore weakening the case for a public sector involvement in tolled highway projects. As for operating costs, the answer to the question of cost-efficiency between the public and private sectors has yet to be completely determined. A study of public owned mass transit systems by Pucher and Markstedt (Pucher, Markstedt, 1983) confirmed the widespread assumption that the public sector is in most cases a worse manager than its private counterpart. This study

showed that public ownership of the mass transit systems of representative large cities had encouraged wasteful cost escalation and management inefficiencies (mainly because of increased subsidies), which would have been prevented to a certain extent with private management.

But the choice between public and private financing can also be based on old political motives. As stated by John Kay, Pr. of Economics, in OECD, (1990): “there is a contrast between public sector financing, which characteristically has a lower required rate of return but for which the funds available are typically rationed, and private sector financing, which demands a higher hurdle rate but for which capital is likely to be available for any project that meets the rate-of-return criteria. That contrast is the result of institutional factors rather than the nature of the financing systems themselves. It is, however, an important element in the increasing inclination of governments to push high-return public sector projects towards the private sector.” We can indeed notice that the United States central and local governments have a smaller involvement in infrastructure than the French. Rail, as well as electric utilities, are for instance public in France, whereas they are mostly private in the United States. Keeping some type of infrastructure in the public sector can actually strengthen it. Without its being public, the French electric utility would probably not have engaged into an ambitious nuclear program, neither would the railway company have carried out its high speed rail program. On this very subject of high speed rail, it is interesting to compare the results of France with those of the United States. The latter are currently trying to catch back on the existing technology and have finally adopted

regulatory measures to support rail with the 1991 Intermodal Surface Transportation Efficiency Act. This law provided that the federal government will assist in the development of high speed rail systems. In addition to it, the 1992 Energy Bill put high speed rail bonds on a par with the airport bonds, granting them the right of tax-exemption, and no state volume cap limit. This underlines how indispensable for the development of infrastructure public regulations are, even in the United States with a tradition of lower public involvement in these issues by comparison with France.

### **3.2 Are There Criteria of Performance for the Financing Methods?**

As we saw in the previous section, the selection of a financing method in France or in the United States is often based not on economical, but on social, or even on political reasons. Hence it is not surprising that one can not find any uniformly adopted criteria of performance to estimate the overall gain brought by a selected method. However, we can still try to identify some, and such criteria could possibly be in the number of two: overall cost, and flexibility.

The first criterion, reflecting on the purely monetary aspect of the financing deal, is the overall cost. Cost is determined by two factors in infrastructure financing: the contractual setting in which the infrastructure is being built or maintained (general contractor, design-build, turnkey...), and the financial cost. We won't enter into the first subject, which goes beyond the purpose of this thesis (for a complete coverage, refer to a thesis titled "Compatibility of Construction Contracting Methods with the Projects and Owners", C. Gordon, MIT, 1991). We will focus on the financial cost factor, i.e. the cost of debt.

For this point, the cost is to be measured to what are usually the lowest rate bonds: the treasury bonds. Central government debt present two advantages to prospective investors: to offer a high degree of security, and to be available in large quantities. Therefore, central government debt is very attractive, and is given the highest ratings by credit agencies, which explains its low return. It can be used as a benchmark for measuring the cost of debt financing.

A commonly made mistake, which is fixed by the “overall cost” criterion, is to view the tax exempt bonds as a “cheap” way of financing infrastructure. By adding the tax-exempt saving, which is in fact borne by the federal taxpayers, tax-exempt bonds appear to be at least as costly as regular bonds, perhaps even more costly because of the lower ratings of tax-exempt bonds. Also, in addition to being costly for the society as a whole, tax-exempt bonds are unfair (as defined in 3.1) to the extent that they are supported by tax revenues of taxpayers who will never benefit from the planned infrastructure. Of course, local governments only look at the overall cost of a infrastructure financing from their point of view, and will find that tax-exempt bonds are very favorable under this perspective.

The second criterion of performance is the flexibility of the financing: indeed the performance of the financing plan is very much dependent upon its capacity to be modified in the course of the project. To draw a broad line between the different financing methods, we can say that debt financing is in the United States the most flexible method, and has become even more flexible in the recent past with the larger utilization of variable rates; user fees are less flexible; and nonuser fees the least flexible, for they are very often



subject to increase restrictions (to raise these restrictions, local governments can decide to set up a special district, which is generally not affected by tax caps). In France, nonuser fees would appear more flexible than user fees because, on the one hand, tax increase restrictions are less stringent, and on the other hand, user fees are more regulated (we have discussed the case of highways already). The flexibility of private financing cannot be so broadly characterized because of the many possible private financing frameworks.

Lastly, it is interesting to compare American municipal bonds with their French equivalent on the grounds of flexibility. Doing this analysis actually shows that the benefits of American municipal bond market low rates is somewhat offset by the lower flexibility of these bonds as compared to the French comparable source of debt financing. Indeed an American municipal bond is difficult to manage (to resell in particular...) whereas it is easy to do so with a French local bank loan, especially with the development of loan variable rates. More precisely, the French intermediation offers at least five area for flexibility to French local governments:

- (i) the maturity of the debt. Loans have a longer maturity in the French loan market than on the American municipal bond market. The local governments traditionally wish to borrow over very long period, 30 years and even more, so that the repayment of the principal and interest become very small. However the bond market only lends generally for up to 15 years, by fear of risk. Some French investors lend over long periods, because they know, and are dedicated to, the municipal market (the CLF is now considering to contract loans of which the maturity would be as long as 40 years);

(ii) the size of the loans. The local governments often need only small amounts of money.

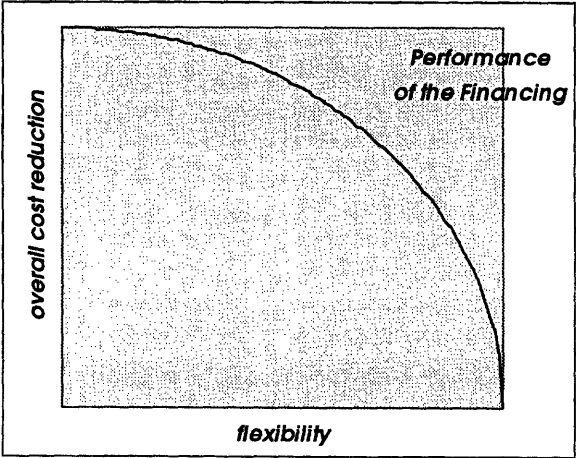
The bond market lend only large sums. To remedy this, local governments can group themselves or issue a multi-purpose bond, as they would in the United States, or use an intermediary, like the CLF. The CLF accepts for instance to undertake loans as small as FF. 20,000 for local governments;

(iii) the repayment of the debt. Local governments often wish to pay the same sum each year because this simplifies their accounting which is based on annual budgets. Investors acting on the bond market generally have a bigger interest in zero-coupon bonds, whereas bank can adapt to the local government conditions and even tailor a custom repayment pattern;

(iv) the possibility to take advantage of foreign market conditions. Local governments generally do not have the technical capacity to use a foreign currency to borrow, in spite of the possible financial gains of doing so. Bigger banks managing huge sums through a complete portfolio of loans, can act on foreign markets and have the local governments benefit of their lower interest rates;

(v) the knowledge of local government market conditions. The last problem is that actors on the bond market may have a limited knowledge of local governments. Local governments which do not borrow frequently on the bond market, and are consequently little known by investors market, have to pay a rating agency, or purchase credit enhancement services to get a low interest rate. Institutional intermediaries in France like the CLF, from their knowledge of the municipal market,

lend at interest rate directly linked to the risk associated with the local government's project, without having to rely on a credit rating.



As a conclusion, we can say that cost and flexibility are the two most important criteria which affect the performance of infrastructure financing. To decide on the correct balance between them, infrastructure owners could use a multi-attribute utility approach (de Neufville, 1990), which is illustrated by the

graph above. This graph shows the locus of alternatives that owners should consider before deciding on a specific infrastructure financing.

## **Chapter 4**

### **Can the French System be Improved?**

#### **4.1 Potential Benefits**

Based on the results of the previous chapters, the goals of improving the financing of public infrastructure in France are twofold: (i) to lower the cost of infrastructure financing, and (ii) to increase the flexibility of infrastructure financing.

Our study has shown that the cost of debt financing was higher in France than in the United States. Public infrastructure investment in France has suffered in the 1980s because of policies aiming at other goals (decentralization, deregulation of the markets) (Terny, Prudh'homme, 1986). The deregulation of the markets was imposed without any compensatory measure for local governments. To increase the performance of infrastructure financing in France, the raising cost of infrastructure financing will be the first issue we will have to address. Our recommendations will aim either at directly reducing this cost or at developing innovative financing methods which compensate for it.

Concurrently, the second issue we will address will deal with the flexibility of the financing methods. It appears from our study that France is not as creative, or daring, as the United States in terms of financing possibilities. Except for mega-projects (the Channel Tunnel, the motorway program, Orlyval, ...) we have only noticed a few innovative methods to finance infrastructure: the Sociétés d'Economie Mixte, where the public power remains

the largest partner, the possibility of leasing, although this one is very narrow, and a few private initiatives... The French lack of creativity certainly comes from its centralized legislative process. In the case of the United States, we have seen that a few states (most noticeably Virginia and California) have taken initiatives ahead of the federal government. The 1988 Highway Corporation Act of Virginia, which made possible the B.O.T. concession of a road to a private corporation, came well ahead of the federal 1991 Intermodal Surface Transportation Efficiency Act, which aimed at encouraging such kind of laws by allowing the states to use federal grants for public/private partnerships. As this example shows, the United States has taken an early start, compared to France, in revisiting their infrastructure financing schemes because of its more flexible legislative setup. French laws are only originated at one level, that of the nation's parliament. This doesn't mean that it is now too late for France to do anything about its infrastructure. In the next sections, we will see where French laws stand so far, and what recommendations could be made to improve the financing of public infrastructure in this country.

## **4.2 Regulatory Issues**

In the following review of the French laws affecting infrastructure financing, five major pieces of legislation will be brought to the reader's attention, regarding: the unlawfulness of tax earmarking, the SEMs, leasing by local governments, public/private partnerships at a local level, and regulation of private investments. In each cases, the status of the equivalent situation in the United States will be reviewed.

Regulating broadly on public finance, the law of Jan. 2, 1959 banned any earmarking in public budgets. This implies today that public revenues cannot be attributed *ex ante* to a specific expense (policies such as earmarking a few cents of gas tax per gallon for road construction or maintenance are unlawful). Therefore, gas tax and other vehicle-related revenues are considered as general purpose taxes, and their levels are set independently of transportation infrastructure investment requirements, for the purpose of raising general revenues and achieving various policy objectives. This creates confusion in the mind of the French tax-payers. For instance, vehicle-related revenues are used for expenses such as to meet the cost of welfare programs. In the United States, nearly all of the federal aid funds for road infrastructure (the Highway Trust Fund) are derived from fuel taxes. At the state level, twenty-nine states have dedicated user fees (including a share of the gas tax). In the other twenty-one states, part or all of the user fees are placed in the general fund, as in the case of France (Lockwood, 1995).

Local governments were entitled to create some *Sociétés d'Economie Mixte* (SEM) by the law of Jul. 7, 1983. SEMs were already existing at the national level. They had been used to setup the concessionary parastatals which financed the motorway program. This law gave local governments access to private funds although it maintained that more than 50 percent of the SEM's capital would be held by local governments (Article 1.2), and that profits would be limited by a 6 percent maximum rate-of-return on investment. Those two articles constrained the development of the SEMs because private investors were afraid to see their capital in the hands of public sector representatives, and because the

6 percent maximum rate-of-return didn't result in being a serious incentive for private investors. In the United States, the regulation of the like companies and the commingling of private and public funds is up to each state's legislation. It appears from the case of the Dulles Greenway that the regulation can be more favorable to the private side than in the French case, making it easier to reach an agreement with the private investor: TRCV, the concessionary company for the Dulles Greenway, was allowed a declining rate-of-return on the project, going from 30 percent in the first years to 14 percent from the seventeenth year up to the end of the concession (Virginia State Corporation Commission, Final Order, July 6, 1990).

Leasing to the local governments was first allowed by the law of Dec. 31, 1986, Article 87. This law merely expanded the qualifications of the existing SOFERGIEs (societies used for energy saving programs), authorizing them to carry out leasing agreements with local governments for the purchase of any equipment or infrastructure needs, as long as this equipment would result in an activity generating tax revenues. Leasing remained therefore only scarcely used, never for untolled facilities, only for water sewage treatment plants or any like equipment generating tax revenues. As compared with the United States, leasing in France was impaired by the obligations to: (i) use the services of an existing SOFERGIE, and (ii) choose only tax-generating infrastructure for the leasing contract.

Public/private partnerships were characterized by the law of Jan. 5, 1988. This law enabled local governments to financially support a privately funded project, i.e. to take a

share of its construction or operating cost, and defined the cases in which this public support of a privately funded project was applicable. In the United States, such support is regulated at the state level. However, as shown by the 1991 Intermodal Surface Transportation Efficiency Act, the general trend goes toward encouraging such public/private partnership. One provision of this Act is indeed to extend the application of federal grants to privately sponsored projects, so as to make some infrastructure projects attractive to the private sector, when necessary.

Lastly, the by-law of Dec. 30, 1988 regulated *a posteriori* the level of toll rates on the French motorways. It requested that toll rates be approved from this point on by the Ministry of Finance. By comparison, in the United States, toll levels and other regulatory issues between the public sector and private investors that have been negotiated beforehand have never been so far unilaterally revised afterwards. In Virginia, both the rate of return and the toll rates proposed by TRCV for the Dulles Greenway have to be submitted to the State Corporation Commission's approval; in California, the State Road 91 project (one of the two ongoing privately funded projects in this state) is only rate-of-return regulated. The French by-law of Dec. 1988, which abruptly changed the rules of the game, created a shock to the private community. This example should not be reiterated in any country where private involvement in infrastructure financing is sought.

### **4.3 Recommendations**

The most striking difference which was raised in this thesis between France and the United States about infrastructure financing is the spread between their cost of debt financing.



This spread arose as a consequence of the French decentralization laws and the deregulation of the financial markets in the 1980s, which withdrew all existing advantages to local governments when borrowing on the markets. Other countries than France, such as Japan through the Trust Fund Bureau, Germany through the Savings and Loans which are co-managed by local governments, and as we saw the United States through municipal bond tax-exemption, assure concessionary rates to local governments. Should France do the same and restore a specific mechanism to lower the cost of debt financing for local governments? As it was demonstrated in chapters 2 and 3, infrastructure projects are sometimes characterized by a low rate of profitability and yet a high social and economic rate of return (water sewage treatment plants are a good example of this). Infrastructure projects are also sometimes chosen for political reasons, in spite of unfavorable economic projections. For these reasons, it would be useful to restore the possibility to borrow at low cost for the local governments. A tax-exemption mechanism such as the one existing in the United States, or a concessionary rate such as what was existing before the French reforms of the 1980s are two possible methods of achieving this goal. The former method seems attractive now that the local governments have much more freedom to borrow than before the reforms, as it would entice them to act more independently and efficiently, and not to rely on rates maintained artificially low by the central government.

A financing method which is less developed in France than in the United States is leasing. It is currently only applicable through special institutions (SOFERGIE), for specific kind of infrastructure (those generating tax revenues). For these reasons, leasing is not widely

used in France. However, this method undoubtedly offers some advantages when compared with the other ones. For instance, leasing makes it possible to adapt the repayment rent of the infrastructure to economic indicators of the project, whereas using debt financing, the interests are fixed beforehand and cannot be modified on the basis of the infrastructure project's results. There is no reason to constrain the use of leasing but for the central government to try to restrict the range of financing tools available to local governments, in order to get a tighter control on them. It appears that the constraints currently applying to the use of leasing should be lifted. A broader applicability of leasing should already have accompanied the French decentralization laws.

Neither in France nor in the United States are there still any ideological issue on the opportunity of private intervention in public infrastructure financing. Both countries have been using private money to finance infrastructure, and laws are beginning to reflect this narrowing between the public and private sector (Intermodal Surface Transportation Efficiency Act, French law of Jan. 5, 1988, etc...). However, France appears reluctant to admit the greater need for private involvement. The law of Jan. 5, 1988 has only begun defining partnerships between the public and the private sector, and should be further elaborated upon. A few examples demonstrate the ambiguous and inefficient public/private relationships so far: Orlyval, the motorway program, and the Channel Tunnel. In the case of Orlyval, the public power decided a 50 percent increase in Orly airport's parking facility, during the construction of the VAL transportation system. This unquestionably contributed to the small ridership of Orlyval and to its eventual bankruptcy. In the case of

the motorway program, as we have seen, the government unilaterally decided in 1988 to review the toll rates on the existing motorways, on the grounds of public interest. Even in the case of the Channel Tunnel, the cost of the project was pushed up by the implementation of increasingly stringent safety regulations. To avoid the renewal of such mistakes in the future, the French public powers should, first, define more clearly the respective obligations of the public and the private side in a partnership agreement (such as the very complete, 350 page long, Comprehensive Agreement between TRCV and the Virginia Dept. of Transportation, regarding the Dulles Greenway concession), and secondly, associate the private sector earlier in the preparation of a project. Also, as confirmed by the 1988 by-law on toll rates, France mostly regulates private utilities by capping their fares. Inversely, the United States generally regulate private utilities by capping their rate-of-return. The latter gives more incentive for the private utility to develop, and gives it more flexibility when faced with unexpected events. It could also be introduced in France for high risk projects.

Another possible area of improvement is given by the accounting system of the French local governments. The current system is not favorable to a development of the latest tools in infrastructure financing (leasing, public/private partnerships...): deposits must be made in the French Treasury accounts, with zero interest, results take a long time to appear in the accounting reports because of a burdensome administrative process, stocks and amortization are not incorporated into the accounts, neither are the results of the SEMs whose shares are owned by the local governments, and so forth. The accounting

regulations for local governments have not been modified after the decentralization laws of the 1980s. A revision should be carried out, as well as for the accounting regulations of the SEMs, so that local governments and the SEMs could more easily take advantage of the new financing tools at their disposal, by highlighting in their accounting reports their assets, i.e. by following a more corporate-like accounting plan.

An issue related to the accounting rules of local governments is that of the credit rating of the bond issues made by them. Such credit rating is done, as we have seen, routinely in the United States. In France, however, credit rating has only ever been done for less than a dozen of local governments' bond issues. A vivid example of the lack of mutual understanding between French local governments and credit agencies was given in 1995, by a region of France which suddenly terminated its contract with a credit agency for this agency had granted it with an unfavorable rating. Local government financing being less transparent in France as in the United States, because of this lack of credit rating, prevents many foreign investors from lending to French local governments. A wider use of credit agencies would help diversify the sources of loans and would benefit the local governments.

A difficult question raised by this thesis deals with the opportunity of earmarking taxes. To a smaller extent, it is advisable that France adopt the possibility of earmarking taxes. It should not be seen as a loss of flexibility in the public budgets but as a gain in clarity, and, as we have seen in the chapter 3, of fairness towards the infrastructure users and the rest of the people. With tax earmarking, the exact cost of the utilization of an infrastructure,

including all the externalities, could be spelt out, charged to the users, and the proceeds be used to serve their original objective.

Lastly, this thesis has shown that France, as well as the United States, are currently experiencing an era of rapid changes in infrastructure finance. During this period, it would be useful for policy-makers to know how much will be spent ahead, in construction or maintenance. Unlike the United States, France has not carried out such kind of surveys making the count of its infrastructure stock, and coming needs (see section 2.2.2). It would be advisable to carry out now such analysis at a national level, so as to find out what the financing needs are, and to design a plan in order to meet these needs, by using the conventional and more innovative methods that were discussed in this thesis.

#### **4.4 Conclusion**

In spite of their past differences in financing infrastructure, France and the United States have now a point in common: because of greater needs and smaller amount of funds, both are looking for new ways of financing their infrastructure needs. The current chapter has been dedicated to finding possible improvements in the French system, based on the two countries' past experiences. Through this analysis, it appeared that France and the United States have been working separately on the same questions: reviewing the existing financing methods (user, nonuser fees, and debt financing), developing new methods for the public sector (e.g. leasing...), and sponsoring public/private partnerships, or even wholly private financing schemes. The ideological differences between the two countries are becoming more and more narrow. Interestingly, it is not only France which is moving

in the American direction, by giving, for instance, more freedom to its local governments and progressively opening its financial markets to the public sector. The United States is also moving in the French direction, by rediscovering tolls, and more recently talking about creating state infrastructure banks, thereby reintroducing the intermediation between local governments and the financial markets which characterizes the French debt financing system. In addition to the recommendations which were made in this thesis, a conclusion emerges from the work of comparison which was done therein: there has been a progressive harmonization, in the past few years, between the French and American infrastructure financing methods.

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