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# FINANCING TRANSPORT INFRASTRUCTURE PROJECTS IN ITALY: A CRITICAL ANALYSIS OF THE MAIN APPROACHES

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## ABSTRACT

This paper aims at analysing the methodology used for financing large infrastructure projects in Italy. In particular, it focuses on the Italian highway sector, where in the last years many projects have been launched using new financial instruments.
The paper discusses three of these "instruments". The first one is the Project Financing, discussed starting from a general review, analyzing also the different typologies used, the risks involved and their allocation among the various subjects that take part in the PF mechanism. A special case concerns the recently introduced model used for the Italian highways, known as "PF with takeover compensation".
There are two other important mechanisms used for financing infrastructure projects in Italy: the exploitation of road demand rigidity and the spreading of the investment over the entire network, favouring larger concessions.
We conclude that all these three mechanisms present deep flaws in terms of transparency and of contradiction with economic feasibility criteria (that have to dominate the public investment rationale).

*Keywords: transport; investment; infrastructure; project financing; highway.*

# 1. FINANCING TRANSPORT INFRASTRUCTURES

Over the last decades the use of public-private partnerships (PPPs) schemes for financing infrastructure projects in Europe has increased constantly (EC, 2009; Estache et al, 2007). PPPs and PFs in particular are mainly used because they allow the construction of new facilities within a context of tight government budget thanks to private financial intervention. In addition, the public administration can take advantage of the capacity of the private sector to increase efficiency (EC, 2009), while maintaining some prerogatives regarding direction, programming, control and regulation (Debande, 2002).
Project Financing represents a specific instrument for the cooperation between public and private; the main characteristic of PF is that the financing of a new project is evaluated on the basis of its capacity to generate cash flow that is the main source for the repayment of financial debt and for the reimbursement of the shareholders' equity.
However, PPPs and PFs in particular encountered a good success among decision makers also for the use of PPPs to *"bypass spending controls and to move public investment off budget and debt off the government balance sheet"* (Schwartz et al, 2006). In order to avoid this distorted usage of PPPs the government has to analyze carefully all the risks associated with this tool and ensure that they are assigned to the stakeholder best capable to manage them.
Within the context of PF, risk allocation represents the most critical issue since the wrong allocation compromises the final result. Considering the highways sector, three are the main risks to be considered: political risk, construction risk and commercial risk. For the first two risks, it is clear which is the stakeholder that can better control them. Conversely, traffic risk can be attributed both to the public and private partner because does not have a privileged stakeholder (Vassallo, 2005). In fact, it is not always true that the private concessionaire can control this kind of risk since traffic demand depends from many different variables (macroeconomic conditions, gasoline price, competition from other modes or facilities, etc) over which the private subject has little or no control. On the other hand assigning this risk to the public administration distorts the usage of PF leading to a standard construction contract.
Risk allocation must also consider that there is information asymmetry (Laffont and Tirole, 1993) between the concessionaire and the government that can lead the public to assume some risks that it is not able to manage (de Palma et al., 2007; Cappiello, 1996); for this reason the public decision-maker has to be strong and have competence and expertise in order to manage technically, legally and economically the discussion with the private subjects.
According to the specificities of the project in terms of revenues and costs, there are different types of PF :

1. the "hot project financing", where the project is paid directly by the users' revenues;

2. the "cold project financing", where financial intervention of public administration is needed;

In the first case, the potential cash flow deriving from tolls applied on the infrastructure are such to cover all the costs (construction and maintenance) plus the return on capital. The

latter case is typical of projects that doesn't repay the total investment and maintenance costs with users' revenues; so, a form of public administration repayment is needed in form of subsidies, fees and/or shadow tolls.

The theoretical aspects introduced above does not represent the way PPP is used in the financing of Italian transport infrastructures, and of highways in particular. Highways should be considered as potential applications of "hot" project financing schemes, because sustainable toll revenues are usually above the operating costs and thus allow to repay the investments (case 1, Figure 1). However the most recent projects, due both to rise in construction costs and marginality of the missing network with respect to the existing main routes, show a lower capability of self-financing with revenues. Current projects are then not completely "hot", needing public support to cover substantial shares of total investment (case 2, Figure 1).

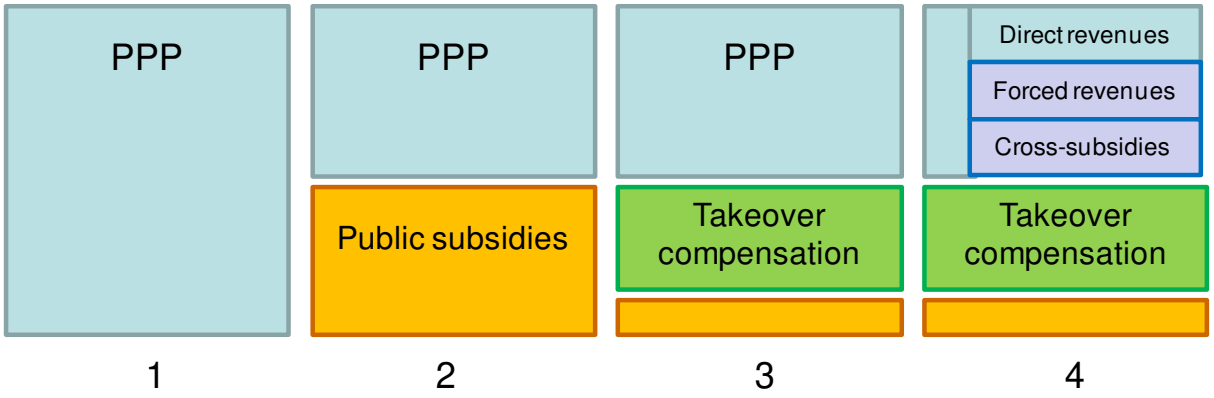


Figure 1. From "hot" PPP to "colder" schemes

This paper will focus on further "degenerations" of the pure PPP scheme applied to highway financing in Italy. Firstly (in the following section 2) we will discuss how the concept of "takeover compensation" (case 3, Figure 1), in itself not modifying the essence of PPP principles, has been used in new projects making financially viable virtually any project. Secondly (case 4, Figure 1), we will discuss two further peculiarities of Italian highways regulation, both artificially increasing the revenues of a weak project in order to make it financially viable: exploiting the rigidity of demand, for example by closing alternative routes to shift traffic from existing non tolled roads to the new one (section 3), and the practice used by larger concessionaires to cross-subsidise new projects with the rest of the network (section 4). Finally, conclusions will be drawn (section 5).

## 2. PROJECT FINANCING AND TAKEOVER COMPENSATION: A HELP IN FINANCING HIGHWAY PROJECTS

### The concept of takeover compensation

In the last years Italy has seen an increasing commitment in infrastructure projects. The majority of these projects is included in the so called "*Legge Obiettivo*" ("Objective law", L. 443/01), a sort of national plan for major and strategic infrastructures, that identifies a list of

high–priority transportation projects regarding roads, railways and urban system (Brambilla and Erba, 2004). Given the scarcity of governmental funds risen in the meantime, new financing mechanisms have been introduced to back these initiatives. Despite unsystematic, the role mechanisms such as land value capture[1], cross modal financing[2] and PFs with "takeover compensation", has risen.

Even if the first two are seen as very promising, no significant applications have already occurred. For this reason we will focus here only on the last one which has been recently adopted in the financial plan of at least six highway projects. The "takeover compensation" was introduced in the Italian legislation in 1998 by "Costa – Ciampi" Directive[3]; according to Paolo Costa[4] it was initially thought to protect the agreement between the existing concessionaire and the national road agency and regulator (ANAS) in the case of new investments required by ANAS[5] that, to be repaid, would have exceeded the initial concession period. The mechanism allows that, at the end of the concession period, the old concessionaire is granted by the new one (selected through an open tender) with a compensation equal to the share of investment costs not yet amortized during the first concession period. In other words, the financial and economic plan of the new infrastructure can be based on its technical lifetime also if the concession period is shorter. The exceeding amortization is then shifted to the incoming concessionaire, that goes on with repayment until the end of technical life.

Despite it has been conceived for existing concessions, recently this tool has been *systematically* introduced in the financial plan of several new transport infrastructure projects entrusted through PF. In all the cases, the full concession period (from 19,5 to 30 years) is shorter than the time needed to amortize the investment, due to feeble profitability. It has been evaluated that further increases in toll values or further extension of the concession period were not desirable: higher toll may entail an excessive decrease in traffic demand, while an extension of the concession period until the end of the infrastructure's lifetime can strengthen monopoly conditions. So, the takeover compensation allows to keep tolls at a defined level, comparable to the existing ones, without extending excessively the concession period, already very long. The project becomes then feasible and profitable for the private investor since the compensation leads to a cut in the annual depreciation funds of the concessionaire's income statement.

The next paragraph will go into details of the application of takeover compensation mechanism in PF schemes instead of the traditional use into existing concessions. The description will be followed by a comment on the positive and problematic aspects of this practice.

[1] Applied in the "Quadrilatero" Project for the improvement of the road system of Umbria and Marche Regions.
[2] Applied for financing Brennero Base Tunnel through the allocation of profits generated by the Brennero Highway and, in the future, through the application of Eurovignette Directive.
[3] Direttiva Interministeriale 283/98.
[4] Preface to Milotti A., Patumi N. (2008), *Il finanziamento delle infrastrutture di trasporto. Enti locali e innovazioni*, EGEA.
[5] Without the possibility to entrust these new investment to a new concessionaire.

## Takeover compensation into project financing

A Project Financing scheme is based on the capacity of the project to generate cash flow to repay the debts and to guarantee the private subject an appropriate return on equity. In conventional PFs, the economic and financial plan is structured imputing all the investment to the concessionaire and assuming that the concession period is equal to the lifetime of the project. Through the application of takeover compensation, instead, the duration of the concession can be set shorter than the technical lifetime and the amortisation amount is lower than total investment for the first concessionaire. In fact, the investment not yet amortised during the period will be paid by the new concessionaire via the takeover compensation.
It is evident that this interpretation of the takeover compensation is not a “new” tool for financing infrastructures trough PF, but rather a financial “trick” to extend the repayment period for PFs otherwise financially weak.

A numerical example clarifies how the value of the takeover compensation could be defined within a standard financial plan. As said above an appropriate return on equity is the essential factor to involve private investors, so once this value is defined together with the estimated costs and the revenues of the project, it is possible to identify the value of the takeover compensation that guarantees both the economic and financial equilibrium of the project and the return on the investment for the investors.

The procedure follows an iterative process where the dependent variable is the value of the takeover compensation; in fact once the infrastructure costs and the revenues from tolls are known, it is possible to evaluate the residual non amortized investment equal to the difference between the total cost, the amortization fund, the public subsidy and the takeover compensation value.

It is then possible to define the net income (profit) of the first concessionaire by subtracting from the total revenue the operating costs, the taxes, the financial costs and the annual depreciation; finally the annual value of the ROE is evaluated (Net Income/Shareholder's Equity). If the final value of the Internal Rate of Return on equity (IRR) is lower than the one agreed with the investors, then a new takeover compensation value is defined and the whole iterative process is repeated. The takeover compensation is paid by a new concessionaire that is replacing the first one in the following regulatory period. For him the financial plan will be similar, with the cost of the takeover compensation among the capital costs and the residual amortisation fund to be amortised yet.
The following table presents an example of takeover compensation calculation for an investment of 10’000 €, without public subsidy (for simplicity’s sake), interest rate on debt of 5% and expected ROE of 6%. All the figures are fictitious.

Table 1. Example calculation of takeover compensation.

| | | | | |
|---|---|---|---|---|
| | 10'000.00 | Investment | | |
| EQUITY | 500.00 | | | |
| DEBT | 9'500.00 | cost of debt | 2'624.67 | |
| Public subsidy | 0.00 | takeover comp. | 4'774.67 | |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| operative revenues | 1'000 | 1'500 | 2'000 | 2'000 | 2'000 |
| operative costs | 100 | 100 | 100 | 100 | 100 |
| EBITDA | 900 | 1'400 | 1'900 | 1'900 | 1'900 |
| depreciation fund | - | 1'570.00 | 3'140,00 | 4'710.00 | 6'280.00 |
| residual value | 7'850.00 | 6'280.00 | 4'710,00 | 3'140.00 | 1'570.00 |
| yearly depreciation | 1'570.00 | 1'570.00 | 1'570,00 | 1'570.00 | 1'570.00 |
| taxes | 0 | 0 | 0 | 0 | 0 |
| profit | - 670.00 | - 170.00 | 330.00 | 330.00 | 330.00 |
| ROE | - 134.00% | - 34.00% | 66.00% | 66.00% | 66.00% |

| | |
|---|---|
| Total profits | 150.00 |
| TIR on Equity | 6.00% |

The example shows that the investment, even if the cash flow is clearly insufficient in the 5 years period, is financially sustainable for the private investor that earns a 6% on equity thanks to the 4'774€ takeover compensation at year 5, reducing the yearly amortisation. The same result could have been achieved with a public subsidy at the first year of 3.741€, if available.

## Benefits of the takeover compensation for new infrastructures

The use of takeover compensation in PFs presents some benefits (Milotti, 2008) that justify its application, similarly to those of the original form used in the traditional concessions (as allowed, in Italy, by the "Costa-Ciampi" decree).

Firstly, its effect is beneficial for the P&L account of the concessionaire, allowing a substantial reduction of the amortization needed every year and simply making feasible investments otherwise not financially sustainable.

From the public and regulator's viewpoint, it shortens concession periods, allowing more frequent tenders for concession renewals. Shorter concession periods means more contestability, more competition and finally more pressure for efficiency in the management and exploitation of natural monopolies.

The need for lump sum public subsidy is reduced. Theoretically, an appropriate takeover compensation can determines investments at zero cost for the Treasury. From another perspective, it allows the cost coverage of an infrastructure without expanding tolls above an unsustainable level or without extending indefinitely the concession period.

It is also possible to include in the concession contract mechanisms guaranteeing the conceding body from concessionaire's underinvestment: in this case the takeover

compensation will be reduced, incentivising the concessionaire to make the needed maintenance for keeping infrastructure's value constant.
Finally, it is possible to skim concessionaire's extra profits generated by unexpected traffic increases, by reducing the takeover compensation. This fact, in general, allows to reduce concessionaire's opportunistic behaviours aimed at capitalising as profit the information asymmetries on demand.
All the elements here briefly discussed and supporting the application of the tool, seem to suggest the widest use of takeover compensation, capable of reducing public expenditure, guaranteeing profits regulation and making financially stronger investment projects. However, as will be shown in the following, numerous drawbacks exist and must be carefully considered when designing the contracts.

## Drawbacks and problems

Even if apparently excellent, the inappropriate use of takeover compensation tool in new infrastructures PFs presents some severe problems. Such drawbacks are partially theoretical and partially due to the Italian application.
The first one is theoretical. The prevision of an appropriate amount of takeover compensation allows almost every project to be financially sustainable[6], even if the cash flow is absolutely insufficient to naturally finance the scheme. For example, going back to the fictitious calculations above, a takeover compensation equal to the exact amount of the investment plus the cost of debt needs only 30€ per year of EBITDA to remunerate the hypothesised equity of 500€. No amortisation will be done and the amount of the investment will be simply transferred to the second concessionaire as it is. This fact implies that even transport infrastructure with no traffic and extremely costly can be made financially sustainable by simply calculating an appropriate compensation to be paid to the first concessionaire by the second one[7]. As a consequence, any useless infrastructure could be built. The "solution" to this problem is twofold. Firstly, an independent planner should evaluate the projects, both from the financial and economic viewpoint. Secondly, in theory no reasonable investor would risk to invest its money if at the end nobody will reasonably pay the compensation in order to become the concessionaire of a useless infrastructure. However this apparently absurd case is possible in Italy, as will be commented below.
The second problem is related to the first one. The mechanism allows to postpone a public investment indefinitely, by hiding it behind a PPP. If a project is not profitable, a private investor is willing to anticipate the needed money (in form of debt or equity), only if there is a sure return. The takeover compensation is used to grant such return. The consequence is, however, that the PPP simply becomes a costly loan from a private subject to the state.
The third point is especially related to Italian normative and makes the previous two otherwise absurd points possible. If, at the end of the concession, no new subject is interested in paying the compensation in order to become the new concessionaire of the infrastructure, the law foresees an explicit guarantee for the first concessionaire to have the

[6] With the exclusion of specific norms on bankruptcy in case of insufficient cash flows.
[7] It is worth noticing that this is not at all a theoretical problem only: the Italian project of the Tirrenica highway (discussed also below) is expected to need a takeover compensation very near to the initial investment (both ~3.8 M€). This simply means that 30 years of revenues are sufficient to cover nearly the running costs.

amount paid anyway. The guarantee fund (*Fondo Centrale di Garanzia per le Opere Pubbliche – FGOP)* is held by the "Cassa Depositi e Prestiti" (hereafter CdP), a joint – stock company under public control managing the capital collected by postal saving accounts. At the moment there is a strong debate between concessionaires and CdP about the application of the FGOP. In fact, the CdP requires the fulfilment of strong criteria regarding the economic and financial viability of the project (regarding in particularly cash flow after the concession period, costs, etc) and the creditworthiness both of the concessionaire and of the grantor. These conditions are however too strict for the concessionaires. Whereas the guarantee is not applied, there is also the possibility that once the concession has expired the public grantor pays the takeover compensation value to the concessionaire, becoming the new highway operator. In confirmation of the distorted application of takeover compensation tool and of the risk for the public expenditure, we report here the words[8] of Paolo Costa, co-author of the Directive that introduced takeover compensation in the Italian normative:

> *"The most recent idea assumes the use of takeover compensation as an element already in the initial concession agreement, during the selection of the first concessionaire. This fact implies,* de facto*,* ex post *public subsidy (since at the end of the concession period, the grantor is not obliged to award the concession to a new operator). This approach, is, financially speaking, an ingenious (creative?) way to postpone in the future the possible public expenditure."*

# 3. EXPLOITING DEMAND RIGIDITY: A TRICK FOR FINANCING HIGHWAY PROJECTS

## From free to tolled roads

The demand for highway transportation represents the outcome of the value that consumers place on traveling in a particular time, manner, and place, as measured by their willingness to "pay" for a trip (FHWA, 2009).
Demand levels may vary according to many variables that range from socioeconomic conditions, operating costs (fuel price, oil and maintenance), tolls value, travel time, congestion level to more subjective parameters like income levels, comfort and convenience, etc. Travel demand elasticity represents the variation in quantity of travel demanded to changes in the perceived price of travel. One of the main variable affecting the level of demand is the presence of transport alternatives and their costs to the users.
Moreover, the elasticity is not constant according to timeframe being considered; in fact researches showed (Burris, 2003; Matas and Raymond, 2003; Odeck and Bråthen, 2007) that demand is typically less elastic in the short run than in the long run. This statement is intuitively obvious since travelers do not change their behavior soon after the increase in

[8] Our translation from the preface to Milotti and Patumi (2008).

price of travel, but the effect increases over time. For example, their housing and employment locations are likely to remain fixed initially. To the contrary, in the long run travelers may adapt to the new context both changing their transport behavior (looking for cheaper alternatives or other transport modes) or moving closer to their work.

As said above, the elasticity of demand depends also by the quality and availability of close substitutes. In fact, for example, if free alternative road or cheaper public alternative serve the area, travelers are likely to readily switch from the tolled highway to the more convenient alternatives resulting in high-demand elasticity. Conversely, if there are no good substitutes, travelers might accept to pay a higher price or find another solution (change job, move closer to the place they work), in which case demand is likely to be inelastic. Such rigidity, especially in the short run, benefits the concessionaire of monopoly rents (Debande, 2002).

In the next paragraph we will shortly present the case of an highway project in which demand is artificially made inelastic through the downgrading of the existing free alternative road. The resulting increased willingness to pay of users (that do not have any realistic alternative) is exploited to finance the investment.

## A12 Highway – Tirrenica

Tirrenica highway project will connect Civitavecchia in Lazio and Rosignano in Tuscany, linking, in general, Genoa to Rome. At the moment the highway (A12) consists of few kilometers in Tuscany and in Lazio while the remaining connection is represented by a non tolled motorway, called “Variante Aurelia”, between Rosignano and Grosseto, and a national road between Grosseto and Civitavecchia, called “Aurelia”.

Figure 2. Livorno Civitavecchia connection.

In 2000 the national road agency (ANAS) proposed a project for the upgrading of both the “Variante Aurelia” and the old “Aurelia” road (that at the moment presents a non homogenous road system with short links with only two lanes and some grade level intersections which entail high accident rate). The cost of that project was around 870 M€.

This project was abandoned in favour of a heavier solution. The new project (206 km) will extend the existing A12 regional motorway through the upgrading of the "Variante Aurelia" and the construction of a brand new highway that will substitute the old "Aurelia". The "Aurelia" will be downgraded to a "park road" (according to DM 5/11/2001) with only one lane for each direction, bicycle path and a series of roundabouts.
The new project will cost around 3'800 M€ and it will be realized in project financing by SAT, a subsidiary of the biggest highway operator in Italy ASPI.

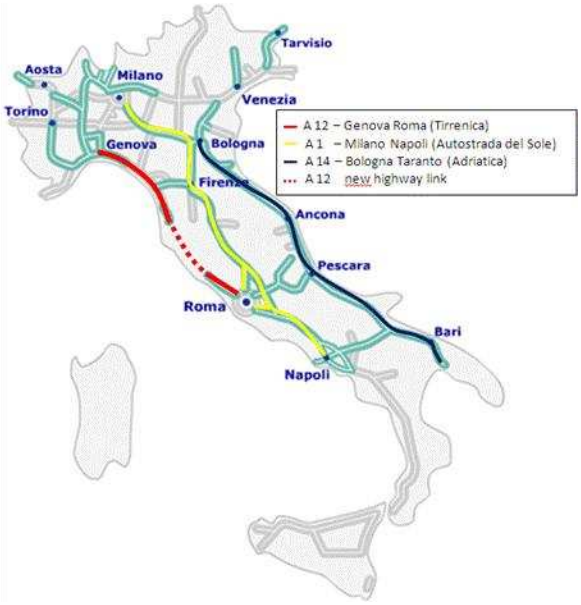


Figure 3. Italian North-South highway links.

The most problematic aspect of this project concerns the decision to downgrade the Aurelia route to a road park: if it may seem reasonable that, once a better infrastructure will be available for the heavy and fast traffic, the older infrastructure is re-designed in order to better deal with light and slow mobility (including bicycle lanes). However this decision seems not to be taken for these "environmental and quality reasons" and will actually force the motorists (especially those moving on short-medium distances with no cheaper route or modal alternative) to use the new tolled highway link.
The financial viability of the A12 seems to derive mainly from the choice to downgrade the old Aurelia: the removal of any realistic free alternative route entails that demand elasticity is made artificially rigid. In fact, since the cost of using this road or the costs of modal alternatives (travel cost, ticket cost, cost to reach the station or bus stop, etc) will be much higher than the toll rate on the new highway, travelers might accept to pay a higher price or find another solution (change job, move closer to the place they work)[9].

[9] There will be two different types of users interested by the project, those for short distance and those for long distance (e.g. North - South connection). The latter will use the new highway only if the toll imposed will be competitive compared to the longer highway alternatives (A1 and A14 highways). The users for short distance, in absence of any comparable modal alternatives, will be forced to use and pay for the new infrastructure.

The outcome is that the scheme seems to increase socio-economic costs and not reducing it, given the absence of congestion on the existing non-tolled motorway.
Moreover, if we take into account the actual traffic volume[10] we may say that even with the downgrading of the old alternative there will be low traffic revenues to justify the investment, for this reason the financial and economic plan of A12 foresees the extension of the concession period from 2028 to 2046[11], the introduction of takeover compensation tool that will cover most part of the investment[12] and a significant increase in the toll rate value (annually increase of 5.8% in real term from 2011 to 2017 and 0.5% from 2018 to 2046[13]).

The last consideration regards the construction phase. The majority of work for the new highway (60% of the total construction work) will be realized *in house* by Pavimental SpA[14], subsidiary of ASPI itself which also controls the concessionaire SAT. Since the concession was awarded without a sound competitive procedure[15], this contradicts the common sense and the regulatory theory: to avoid this kind of conflict of interest it would be necessary to introduce *ex post* competition in the construction phase in order to ensure transparency and efficiency.

# 4. CONCESSIONAIRE DIMENSION AND INVESTMENT

## Italian highways framework

Italian highway system consists of approximately 6'500 km, the majority of which is franchised. Part of this network, 600 km, has characteristics of highway, but is built and owned by the national road agency ANAS. The concessionaires are 24, usually privately owned or mixed public-private (Beria, 2009).
The majority of concessionaires are small operators owned by local authorities or by minor private shareholders (Ragazzi, 2008). The two main private groups instead, SIAS Group and Atlantia Group, control most part of the network. SIAS holding, controlled by Gavio Group, through its subsidiaries manages about 20% of the network mostly in the north-west of Italy. The holding company Atlantia SpA, controlled by Benetton family, has the full control of the sub-holding "*Autostrade per l'Italia SpA*" (hereafter "ASPI"), Italy's largest toll motorway builder and operator with 2'854.6[16] km of network under concession that serves the 67% of

[10] The *maximum* traffic volume reached is currently nearly 20.000 bidirectional equivalent vehicles per day (SAT, Studio di Impatto Ambientale - Sintesi non tecnica, Giugno 2005).
[11] In October 2009 the infringement proceeding opened by EU Commission against the extension of the concession period has been closed in favour of the concessionaire (for further details see *Edilizia e Territorio,* 12 Ottobre 2009).
[12] Rumors from the press indicate that the takeover compensation value will nearly equal the total investment cost for the infrastructure (*La Nazione*, 15 Aprile 2010).
[13] *Edilizia e Territorio*, 23-28 Marzo 2009.
[14] The shares of Pavimental are held by the two biggest motorways holding groups in Italy, ASPI - Autostrade per l'Italia SpA (71.67%) and Gruppo Gavio (25.86%). *Source*: Pavimental website consulted on April 20, 2010.
[15] see Ragazzi,2008.
[16] Atlantia SpA webpage.

the Italian traffic[17]. The total network attributable to Atlantia SpA, including also other controlled highways, accounts for 3'413 km and it is used by approximately 4 million people every day (see Figure ).

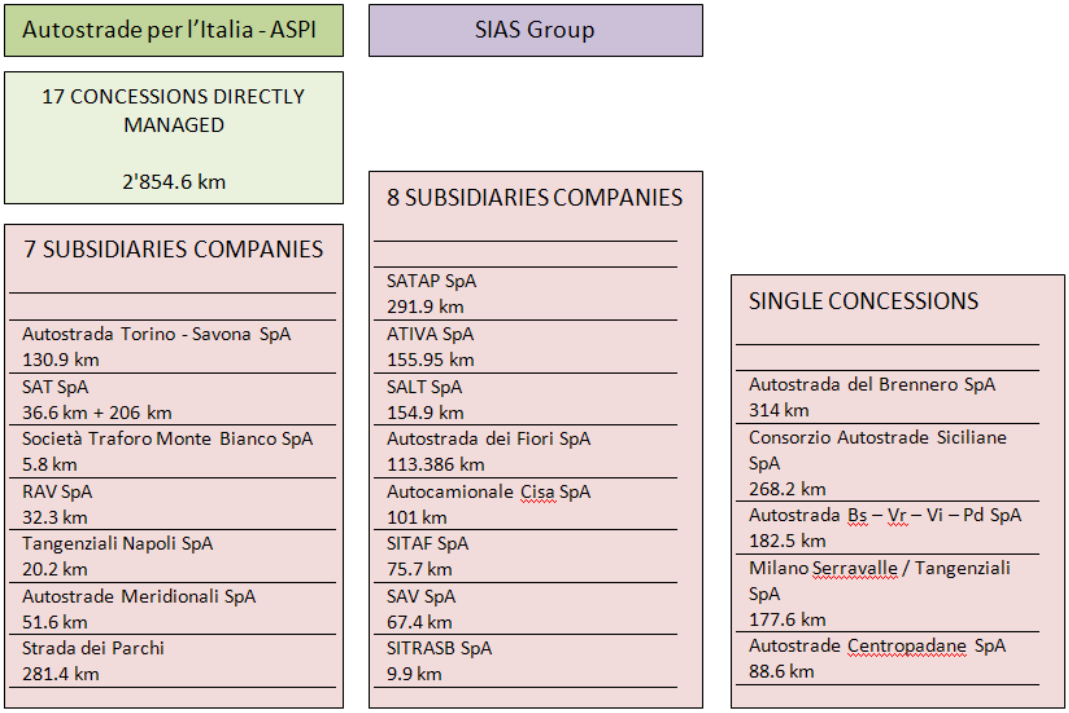


Figure 4. Highway Concession Framework in Italy

As can be seen in Figure 4, an important difference between those two groups is related with their structure (Greco, 2004). ASPI directly controls 17 concessions (all included in one single Agreement between ANAS and ASPI) and indirectly the concessions of 7 subsidiaries (each one signed a specific agreement with ANAS).
SIAS, to the contrary, controls 8 different sub-companies each one ruled by an Agreement. However, none of them has a network which is much longer that the others (Greco, 2004).
This situation of both fragmentation and concentration is not justified by any economic consideration. For example, two successive links of the highway A5 are under two different operators, presently owned by the same group (Ativa SpA and SAV SpA, both by SIAS), but ruled by two different contracts. There is clearly no rationale of such division, rather depending only by the history of ownership relationships of concessions. One can suggest to verify the scale of the economies of scale of the whole Italian highway sector, since present situation absurdly ranges from the 2500 km of ASPI to less than 67 km of half of the A5 motorway (SAV concession).

## Network dimension and investment

The toll definition system for ASPI is defined by the Agreement signed between ANAS and ASPI in 2007 and approved by the Law 101/2008; toll charges increases will be equal to the

[17] The importance of the ASPI network is summarised by two figures: its network develops in an area hosting 83% of the Italian population and accounting for the 87% of the GDP (source: ASPI concession contract).

70% of the real inflation value (in the previous 12 months) plus specific tariff components for work performed that were not included in the original 1997 agreement (X)[18] and for new investments[19](K). The value of X is defined considering the works realized by the concessionaire and the traffic volume on the total network (plus the one generated by the new investment). This formula was originally a sort of price-cap, but any aspect related to efficiency has disappeared with the law quoted above (Beria and Ponti, 2009).

Given this toll revision formula, the different dimension and structure of the highway operators entail important financial effect. In fact, it is possible for a large network operator to finance nearly any type of investment (in absence of a public and independent socio-economic assessment) since the cost can spread on the entire network. The investment is then paid even by the users that will not have any benefit from the new asset.
In confirmation of this statement, we report here the words of Giovanni Castellucci, CEO of Atlantia SpA, that speaking of a new investment (Gronda di Ponente project) just started in Region Liguria said:

> "…the project is financially viable, toll increases on the whole national network (of ASPI) for the next ten years have been already scheduled"[20]

This situation is not a problem *per se* (it can be reasonable that users benefited in the past by investments, pay for the new users of the marginal network), but because of the different dimensions of the concessions. In fact, the two large concessionaires are able to issue a sustainable financial plan for virtually any improvement or extension, while small ones can afford only marginal upgrades or need substantial state subsidies or takeover compensation (as described above). This entails problems of equity among the users of the network but it also requires some considerations about the minimum efficient dimension of the concessionaire since this approach could theoretically make financially feasible any kind of project.
A further critical issue is caused by the fact that large operators indirectly controls other smaller licensees. When their networks are too small to generate enough traffic to repay new investment, it is possible that they apply to obtain subsidies from the State. In this case, very frequent, the main Group avoids to self-finance the extensions, even if perfectly capable to do it with the profits coming from its other companies (Ragazzi, 2004).
As already pointed out by Ragazzi (2004) the cost of new investments to be reflected in tariffs is generally negotiated ex ante between the regulatory authority and the concessionaire. Since most of the new investments (mainly proposed by the concessionaire itself in order to justify the extension of the concession period) do not foresee any tender mechanism, there is the risk that concessionaires realize the investments through their controlled construction company (in house), reflecting higher construction cost into higher tariffs.

[18] Atlantia, Financial Statements 2008 – Annual Report.
[19] Not included in the financial plan before 3th October 2006 (source: ASPI concession contract).
[20] Il Secolo XIX Genova, 10th February 2010, pp. 18 -19.

# 5. CONCLUSIONS

In a context of public budget constraints and high public debt levels, governments are less and less able to finance investments in the transport sector that could generate benefits for the society. The introduction of new instruments for financing such investments is commonly recognised to be an important help to invert the trend by providing private capitals. Public-private partnerships, and project finance in particular, can also represent a way for governments to take advantage of the capacity of the private sector to increase efficiency.
Nevertheless, this paper stresses that the effectiveness and general appropriateness of those instruments is strictly related to the rules adopted and to the roles of the involved stakeholders.
Three critical aspects associated to these instruments have been analysed, with respect to the highway sectors (but the same consideration may well be extended to other transport modes) and starting from the analysis of some Italian cases:

1. The use of a "takeover compensation" at the end of the concession period on the one hand allows shorter concession periods (improving contestability and potentially efficiency). However, on the other hand, makes theoretically any project feasible even if the cash flow is absolutely insufficient to naturally finance the scheme;
2. The exploitation of the demand rigidity to stress the financial viability of projects with scarce or no benefits by means of higher tariffs, may generate important social welfare losses;
3. The existence of concessionaires with different network extension introduce distortions under price-cap rules as the current Italian ones. In particular, the same scheme can be feasible if the concessionaire network is large (a small toll increase is spread on the entire network) and not feasible for smaller concessionaires (toll increase would be excessively high and mining demand). This is clearly counterintuitive from a socio-economic viewpoint, because for a scheme should be evaluated the need for public investment independently from concessionaire size.

The analysis of those problems seem to strengthen some common indications of the economic regulation theory:

- An independent appraisal of the utility of projects, based on socio-economical cost-benefit analysis, is important even when they seem to be capable of paying back the investment with tariffs;
- An independent regulation Authority seems to be indispensable in order to introduce a third part in the relationships between the government and the private stakeholders and thus reduce capture risks.

In particular, Italian experience suggests that new tools for financing transport infrastructures may apparently be useful and fair. However the scarce transparency, the existence of rules powerfully distorting the process and the lack of consistent independent cost-benefit analysis, contribute to make feasible even absurd projects and stimulate overinvestment.

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