

The innovative methods of funding transport infrastructures in Italy

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Abstract

The present in Italy public budget constraints and at the same time the need of equipping the country with modern transport infrastructures, induce public administration to research innovative methods in order to carry out the investments.

The aim of the paper is to survey and to verify the effectiveness of the most interesting innovative methods being outlined at the present time in Italy:

- The “take over compensation” applied to infrastructures built after project financing or concession bids, at the end of the exploitation period.
- The “value capture”: the instrument gives the opportunity to monetize part of transport infrastructures’ benefits by capturing the increase of property value experienced after the opening of the new infrastructure.
- The application of “Eurovignette” Directive as a form of cross modal funding: a form of toll, introduced by an UE directive and charged to the road freight transports.

This paper, besides to analyse theoretical elements at the basis of the three innovative funding methods, analyses also the existing experiences in the national context: the Bre.be.mi, the Pedemontana, the Quadrilatero Project and the Brennero’ Brenner rail base tunnel.

Key words: Transport, funding, “take over compensation”, “land value capture”, “Eurovignette” Directive

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Introduction

Investments in infrastructure have a strategic role for a country's socio-economic development. In the medium-long term, the gains in transport efficiency, as the decrease of travel costs and time, affect firms' productivity; in the short run, the construction phase creates relevant job opportunity.

Italy gets behind its main European partners as concerns transport infrastructures availability. The need of recovering this infrastructure gap, in combination to the necessity of public expense control, has required an evolution of financing methods and the seek for alternative funding sources. Italian Government and its instrumental agencies are experimenting some innovative tools that aim at sharing costs, complexity, resources and risks of big projects.

This paper has the objective to describe the most innovative methods that are now being implemented (or foreseen) in Italy. Both theoretically and from the point of view of their empirical application in infrastructure projects, the following tools will be described:

- The “take over compensation” applied to infrastructure built after project financing or concession bids, at the end of the exploitation period.
- The “value capture”: the instrument gives the opportunity to monetize part of transport infrastructures' benefits by capturing the increase of property value experienced after the opening of the new infrastructure.
- The application of “Eurovignette” Directive as a form of cross modal funding: a form of toll, introduced by an UE directive and charged to the road freight transports.

Methodology

In Italy, like in the other Member States, one of the main drivers for designing new funding tools is the recovery of transport's externalities. Indeed, all new funding methods try to “capture” some of the positive or negative externalities of transport infrastructures with the aim of employing them in funding the necessary investments.

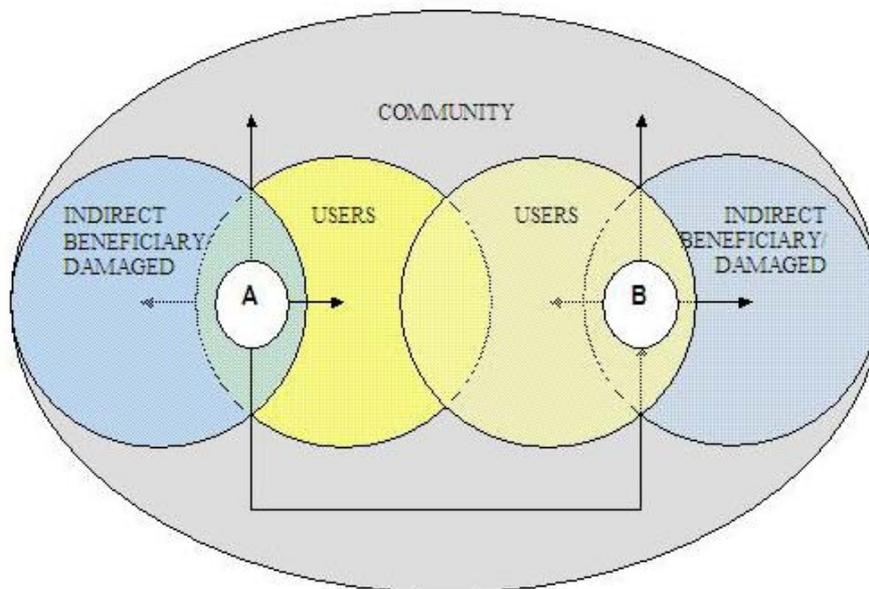
Therefore, a correct set-up of a new funding tool must derive from a correct listing and assessment of positive and negative economic effects of the implementation of infrastructure projects. And all the subjects affected by externalities must be identified. After the benefits and the corresponding beneficiaries are

identified and quantified, a “channeling” mechanisms that can turn them into financial sources has to be found.

Figure 1 describes the spread of external effects of a transport infrastructure A. Being a new transport infrastructure (A) and a new business affected by the infrastructure (B), both inserted in a regional society and its subset (coloured circles), benefits and costs generated by the two activities are represented by the arrows sketched in the figure.

The first and most important benefit (cost) of the infrastructure A affects its direct users. This is represented by the arrow right of A. However, the transport infrastructure A can also generate external effects of different nature: first, if A is a good subject to congestion, every user cause external costs to other users. Moreover, the services supplied through the new infrastructure bring external benefits and costs on the community. Those effects are indicated by the arrows directed to the left and to the top. In the first case the light-blue circle relates to that community subset, located “in the neighbourhood” of the infrastructure, directly affected by its benefits or costs (e.g. accessibility gains or noise pollution increase). In the second case, the benefits and costs affect all the community without the possibility to distinguish beneficiaries from damaged (e.g. the same railway is part of a public rail network that contributes to the competitiveness and to the development of the region). Besides it is possible that the transport infrastructure A affects the activity B and its different categories of users (direct, indirect and community).

Figure 1: The spread of social and economic benefits and costs of a transport infrastructure.



Summarising, we can say that it is possible to identify, for each transport infrastructure, some categories of benefits (or costs) and the subjects involved:

- direct benefits (and in case the cost of congestion) that affect the subset of the community composed by the users;
- indirect benefits (or costs) that affect a specific subset of the community, most likely localized in a area influenced by the infrastructure;
- indirect benefits (or costs) that affect all the community, without any possibility to distinguish the affected subjects and to share gains and losses among them,
- indirect benefits (or costs) that affect some activities, and their promoters, directly connected to the new infrastructure.

This classification differs in part from the traditional one, that progressively decreases the users' contribution (that would cover the production costs) with the increase of the public interest of the infrastructure and its service. In this way the traditional approach distinguishes only the income deriving from the provided services and linked to the divisible benefits (eg. public prices, political prices, tariffs or taxes) and the public sector proceeds deriving from the general taxation system and connected to the indivisible part of benefits.

On the contrary, the methods here analyzed aim at "capturing" some of the above mentioned economic benefits (or costs) and to "channel" them for the funding of transport infrastructures.

In this perspective, the "take over compensation", based on the concept of "residual value" of the infrastructure at the end of the concession period, is a proxy of the value of benefits that the infrastructure can spread during its lifetime after the (first) concession period and the end of the - that in turn derives from the fact that the infrastructure can be profitable thanks to the application of price's mechanisms (eg. road tolls) - it aims to take, from the users, the direct benefits generated by the transport infrastructure. The "value capture" aims at collecting the indirect economic benefits experienced by some economic subsets affected by the existence of a new infrastructure, whilst the "Eurovignette" approach to cross-modal financing aims at internalizing external costs provoked by road infrastructure to a specific subset of the community, and employing the amount in the realization of a less pollutant transport alternative (e.g. railway).

“Take over compensation” applied to motorway concessions

The concept of “take over compensation” in concession contracts has been introduced in Italian legislation in 1998, by “Costa-Ciampi” Directive¹, but only recently the opportunity of its implementation in financial plans for new infrastructures has been profiled. The “take over compensation” model, applied in financial plans for motorways in concession, foresees that a motorway concessionaire is granted of a compensation amount - equal to the share of investment costs not amortised during the concession period - at the end of the concession. This of course is applied to motorways having a lifetime longer than the concession period. The model affects positively the income statement of the concessionaire even if it takes over the concession from itself, since the provision of the “take over compensation” leads to a cut in the annual depreciation funds of the concessionaire’s income statement.

The need of applying this mechanism to the transport infrastructures that are in concession derives from the fact that the cash flow in the concession period is usually not enough high to cover the initial investment, thus preventing private subjects from investing. On the contrary, by implementing the “take over compensation”, the expected return of the initial investment increases.

Figure 2 gives a graphic representation of the implementation of “take over compensation” model. Particularly it underlines the “take over compensation” effects on the investment’s depreciation trend (included in the financial and economic plan) of an infrastructure realized in project financing.

The line DF refers to the case in which the initial investment is entirely paid by the concessionaire and the duration of the concession period is equal to the infrastructure’s lifetime, whereas the line DC refers to the case in which the initial investment is still entirely paid by the concessionaire, but the concession period is shorter than the infrastructure’s lifetime. The second case is the most common for motorways concessions, and motorways built and managed in “project finance”, i.e. by private subjects, awarded of a special concession which covers the final design phase, the construction, and the operational phase. Project finance bids are ruled in Italy since 1994². The procedure for awarding contracts consists in a two step call for proposals, issued by Public Authorities (still named “concessors”), occasionally taking place after a primitive

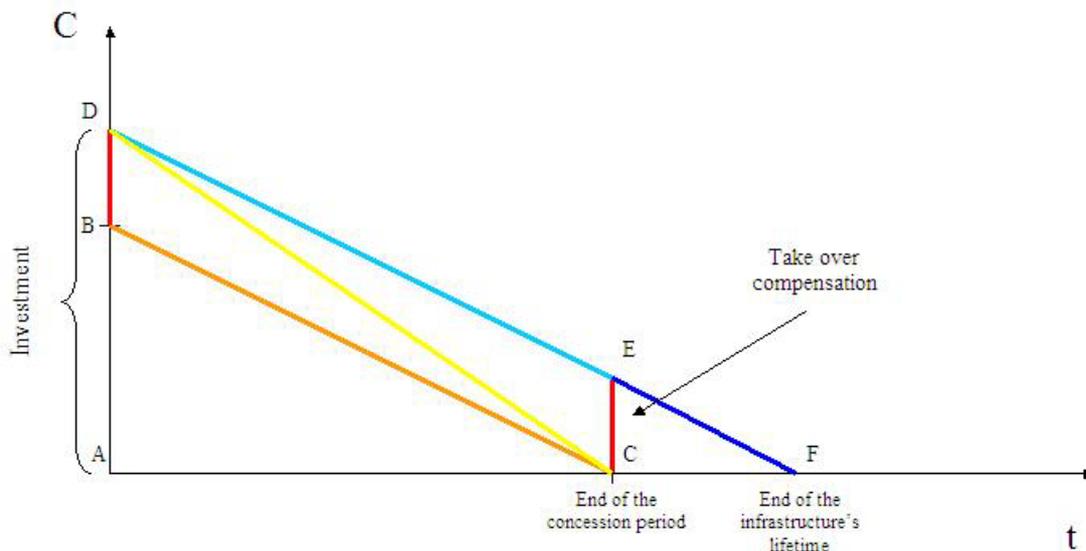
¹ Direttiva Interministeriale n.283/98

² Law n.109/1994, artt. 38-bis/ter/quarter.

proposal made by a promoter³. Concessions awarded after a project finance tender usually do not include any public grant, and they follow the “Build-Operate-Transfer” model: it implies that – whatever the infrastructure lifetime is – all goods that have to be reverted to the public concessor have to be fully amortised during the concession period. Since the concession period is usually one of the evaluation factors in project finance tenders (the shorter is the concession period offered, the faster the concessor has the infrastructure at its disposal), if the concession period is very shorter than the infrastructure lifetime, the concessionaire will register in its income statements depreciation funds significantly higher than those calculated applying technical depreciation rates. The concessionaire then has to bear the risks of construction price uncertainty: price increases would strongly affect depreciation funds, since there would be no way to increase the concession period, nor to increase (for motorways) unit tolls for raising revenues.

If the “take over compensation” is applied, the financial and economic plan is structured on the basis of the infrastructure’s lifetime, also if the concession period is shorter.

Figure 2: Graphic representation of an investment implemented with the “take over compensation” (BC).



Indeed, as showed in the figure (where C-axis represents the residual value of the infrastructure, and t-axis the time flow), the economic and financial plan is structured as the concessionaire would bear all the investment (AD) and would have in concession the infrastructure for all its lifetime (AF); but, in reality, the concession period is shorter (AC) and the amortization part exceeding this period (CF) will be charged to the incoming by the “take over compensation”. Therefore, BC has the same slope of DC, but it is translated until

³ Details on project finance regulation in Italy are given in Gervasoni A., Del Giudice R. (2002).

crossing the x-axis in the concession end point (C). The difference on the y-axis between the line DF and the line BC is equal to the “take over compensation” (CE), while the amortization that the first concessionaire avoids is equal to the “take over compensation” divided by the years of concession (CE/AC).

For other cases, BC represents the “original” investment cost of the infrastructure, before being increased by “extra-costs” not due to the concessionaire (e.g. after revisions of raw material costs or after the inclusion of environmental protection devices requested by local authorities): in that very common case, the “take over compensation” neutralises the concessionaire from bearing extra costs.

Analytically, what we have said can be summarised as follows:

Concession period < lifetime of the infrastructure	Line DC	$y = AB - w AC$
Concession period = lifetime of the infrastructure	Line DF	$y = AD - k AF$ (with $k < w$)
Concession period < lifetime of the infrastructure with TAKE OVER COMPENSATION	Line BC	$y = AB - k AC$

Therefore, giving a concession period shorter than the lifetime of an infrastructure, the line that shows the amortization profile with “take over compensation” has a slope lower than the one without “take over compensation” ($k < w$). It means that without “take over compensation” the concessionaire, for having the same amortization profile that with “take over compensation”, has to obtain more revenue, that means: a toll increase (less practicable for the transport infrastructures that are “mixed goods” and that therefore do not follow market rules) or it has to obtain additional public grants.

Therefore, from the point of view of the public subject, the “take over compensation” permits to reduce – or, at least in theory, to eliminate – the public grants necessary to trigger private investments in transport infrastructures. However, it must be underlined that, in the budget, the “take over compensation” is differently recorded in comparison to public contributions. Indeed, public contributions are recorded during the concession period, while the “take over compensation” is paid only at the end of the concession period.

Of course, the same results would be possible with an extension of the concession period until the end of the infrastructure’s lifetime. However, in Italy public authorities still prefer to award concessions for a less than 30 year period, in order to prevent procedures (e.g. from the European Commission) for distortion of market competition.

PEDEMONTANA	M. euro
Public contribution	1.245
Equity	541
Loan capital	2.356
Initial investments	4.115
Take over compensation	1.290

Given these data, it is possible to obtain a project's schematic description on the basis of what we have seen in figure. Indeed, given AD and AF, it is possible to obtain k (replacing the data in the equation $0 = AD - k \cdot AF$). Subsequently, starting from the amount AD (the amount of the investment without the "take over compensation"), the financial plan of project realized in project financing with "take over compensation" can be structured. For Pedemontana, line BC is $y = (4.115 - 1.290) - k \cdot x \rightarrow y = 2.825 - k \cdot x$

Given $0 = 2.825 - k \cdot 30 \rightarrow k = 94,2 \rightarrow$ line BC is $y = 2.825 - 94,2x$ ($x=30; y=0$)

The line DF is then: $y = 4.115 - 94,2 \cdot x$ Given $0 = 4.115 - 94,2 \cdot x \rightarrow x = 43,7$

Thus, the financial plan built with the assumption of "take over compensation" implies that the theoretical infrastructure lifetime is 43,7 years, more than one third longer than the concession period.

The Bre.Be.Mi project will connect Brescia with Milan with a "direct" motorway, some 50 Km long. The need for such motorway comes from the very high congestion on the actual East-West motorway (A4) from Milan to Brescia.

The construction and operational exploitation has been given to Bre.Be.Mi SpA (awarded of the concession after a project financing procedure) for 19,5 years. The amounts contained in the economic and financial plan are the following.

BRE.BE.MI	M. euro
Public contribution	0
Equity	243
Loan capital	1.152
Initial investments	1.395
Take over compensation	920

As we have seen for Pedemontana, given the investment data, it is possible to describe the project on the basis of what we have seen in figure 2.

Line BC is $y = (1.395 - 929) - k \cdot x \rightarrow y = 475 - k \cdot x$

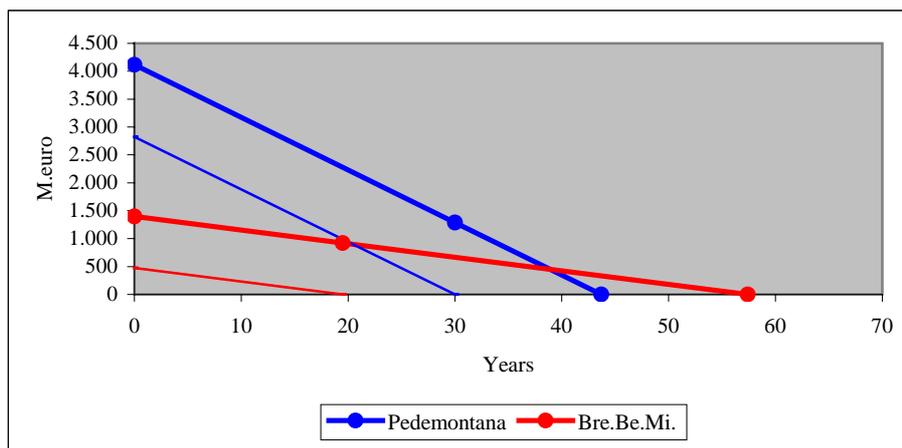
Given $0 = 475 - k \cdot 19,5 \rightarrow k = 24,3 \rightarrow$ line BC is $y = 475 - 24,3 \cdot x$ ($x=19,5; y=0$)

The line DF is then $y = 1.395 - 24,3 \cdot x$ Given $0 = 1.395 - 24,3 \cdot x \rightarrow x = 57,4$

Thus, the financial plan built including the “take over compensation” implies that the theoretical infrastructure lifetime is 57,4 years, almost three times the concession period.

In figure 6 the results emerged above are summarized. It is a schematic representation of the two investments, useful to try to compare them (in the reality the amortisation quotas are not the same since they are allocated also on the basis of the expected revenues). In particular, amortisation profiles with a concession period long as the highway’s lifetime (including the “take over compensation”) are represented in bold. It is interesting to see that the Pedemontana’s curve has a slope bigger than the Bre.Be.Mi’s one, because, even if the investment is bigger, the infrastructure lifetime assumed in the financial plan is shorter, and the “take over compensation” is smaller compared to the investment cost. Indeed, for Pedemontana is foreseen a public contribution, while for Bre.Be.Mi it is not.

Figure 6: Schematic representation of Pedemontana and Bre.Be.Mi’s investments



Until now, we can say that the assumption of “take over compensation” has permitted to re-start the project procedure of Pedemontana and Bre.Be.Mi. with no further grants from the public.

The “land value capture”

The so-called “land value capture” is the process by which a public subject tries to recover part of the value that an infrastructure adds to a property (Hass-Klau, 2004).

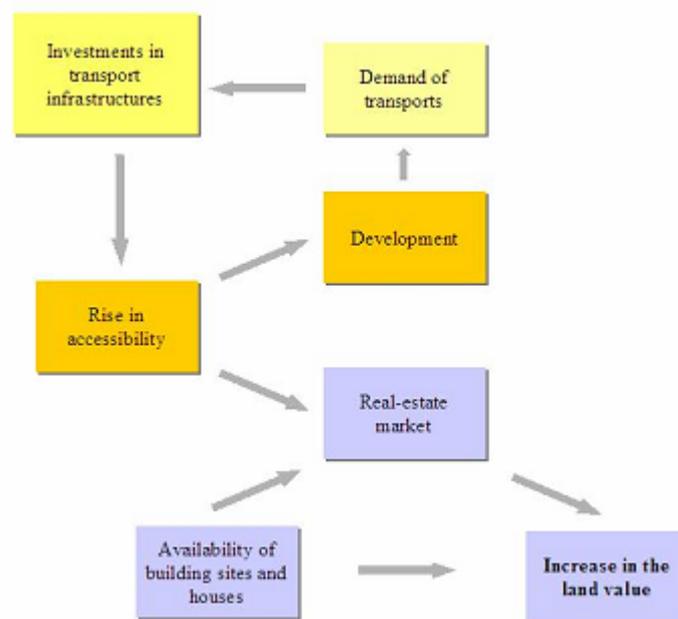
Currently still little used also at the international level, this instrument is based on the evidence of the influence that transport infrastructures have on the economic development and especially on the land value (Cervero 1994, 1998 e 2002; Ryan 1999; Hack 2002).

Indeed, since transport infrastructures increase the accessibility, at the micro-economic level they increase the value of houses and activities localized in the area; at the meso-economic level (Llewelyn-Davies and UCL, 2003), they encourage investments and economic development in the area, generating an important virtuous circle (figure 7).

Giving these assumptions, many economists, among which William Vickrey, have suggested the possibility to finance the costs of transport infrastructures by the “capture” of the increase in property value.

At the international level, some methods have been developed (eg. TIF in the USA) and there are different cases of investments in transport infrastructures structured in order to “capture” their benefits for their founding (e.g. Copenhagen Metro).

Figure 7: Impacts of transport infrastructures’ investments



It is important to underline that, depending on the method’s structuration, each tool can “capture” (i) the indirect benefit of the transport infrastructure by which a specific subset of the community profits (localized in an area of influence of the infrastructure), or (ii) the indirect benefit gained by some activities and their promoters, directly connected to the new infrastructures. The first case is represented, for example, by mechanisms aimed at capturing taxes on the house owners that benefit from the transports’ improvement (e.g. metro of Copenhagen) and we can properly speak of “land value capture”. The second case concerns mechanisms that, for example, “capture” the royalties of the commercial activities that benefit from being located near the new transport infrastructure and can then benefit of a demand spatially and temporally

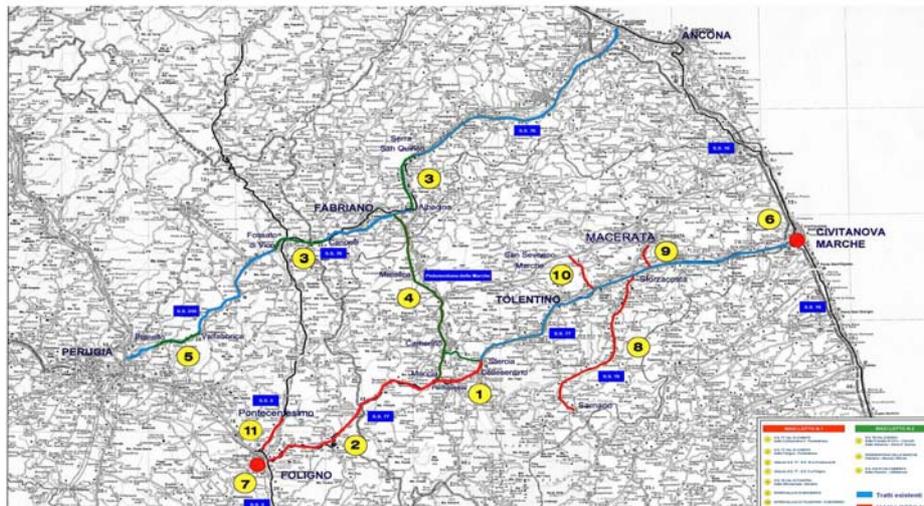
concentrated (eg. some aspects of the “Quadrilatero’s project”); therefore in these cases it is more appropriate to speak of the “commercial value capture”.

The only Italian experience using the so-called “value capture” to fund part of the intervention is the “Asse viario Marche-Umbria, Quadrilatero di penetrazione interna”, that we are going to analyze.

Quadrilatero project

The Quadrilatero is a complex project that aims to improve the road system of Umbria and Marche Regions, along the two parallel axes Ancona-Perugia and Civitanova Marche-Foligno and along the two transversals connected by Fabriano-Matelica-Muccia and by SS 77 roads (figure 8). At the same time the project identifies the industrial/commercial areas to be built up along the planned road infrastructures, so that a part of the costs of this intervention - that has a total cost of 2.156 million of Euro - can be financed by the “capture” of the economic benefits generated by the transport infrastructure.

Figure 8: The Quadrilatero Project



In Italy, the Quadrilatero project is a significant innovation not only for the financial aspects, that we will deeply analyze, but also for the decisional and planning ones.

The decisional innovative aspect consists in the so-called “Wide Area Plan”, approved (first case in spatial planning in Italy) by two Regions. The plan maps out the transport infrastructures of the concerned area and organizes the spatial distribution of the productive areas along the roads (Areas of Development and Leader Areas), creating a great correlation between the infrastructure and the territory.

Financially, the project is innovative because, as mentioned, it uses the mechanism of “value capture”. The essential component for the implementation of this model is the real possibility of internalising benefits generated by the transport infrastructures (mainly the decrease of the generalized costs of transport). Moreover, the Plan, defining the areas (Development Areas and Leader Areas) where the benefits of the increased accessibility are the biggest ones, sets the conditions to monetize these benefits.

In particular, the project identifies the three following foremost sources of “value capture”:

- Municipality’s contributions: the local property tax and the urbanization’s charges of the new productive areas, that will be developed thanks to the presence of the infrastructures, will be “channeled”, as established in the “Plan Agreements”, to finance part of the Quadrilatero project. The Municipalities will revert funds to Quadrilatero SpA only after their collection. The construction of Development Areas will follow normal procedures and therefore, having a quite uncertain timing (eg. procedures of approval can be long), they are the most risky factor of the project. On the contrary, Leader Areas are not subject to the same uncertainty because, being considered as interconnected to the road project, they follow the faster approval procedures stated by Italian Law for “strategic projects”⁴. However, at this moment, it still remains to verify if all the projects will be approved by the CIPE (Inter-ministerial Committee for economic programming) and if the market will positively respond to the calls for tender.
- The contribution of the Chambers of Commerce: following Law 580/93, the subscription’s fee will be incremented by 20% for all companies and individual firms of the area. This contribution has then the aim to capture the benefits that involve all the productive system of the area. As the Municipalities, also the Chambers of Commerce will turn their contributions to Quadrilatero SpA only after their real collection. In this case, however, there is a minimum level of contribution (a risk-free quota), not linked to the development of productive area, proportional to the subscription’s fee that the firms already pay. Therefore the revenues brought by the Chambers of Commerce have a lower risk than those from the Municipalities.

⁴ Law n. 443/2001, so called “Legge Obiettivo”.

- The revenue from the concession of Leader Areas: for each preliminary project there will be a call for tender. Afterwards, the royalties of concession (usually 30 years long) will be reverted to the Quadrilatero SpA. Concerning the risks, for the fourteen areas not approved by CIPE yet, there is still the risk that the CIPE can decide to not approve them (i.e. they would not be identified as areas connected with the project); and for all the twenty-two areas the market response still has to be verified.

Of these three revenue sources, the one that can be properly called “land value capture” is the revenue from the Municipalities, which is structured to “capture” the land rent of the interventions that are developed thanks to the improvement of the transport infrastructure. The contribution from the Leader Areas, capturing the commercial revenues generated by the new activities developed thanks to the new road system, can be more properly classified as “commercial value capture”. Broadly speaking, also the contribution of the Chamber of Commerce can be classified as “commercial value capture” because it is linked to the economic development of the area, resulting from the improvement of transports. However, being only indirectly linked to the “commercial valorization” and “capturing” the indirect benefits from which a specific sub system of the community profits, it can be also theoretically classified as “scope’s levies”. Indeed, the principle that a new levy, or the increase of an existing one, is constrained to the realization of a transport infrastructure, is the same of the one of “scope’s levies” that in Italy have been implemented by the 2007 finance act (law 296/06), but are applicable only by Municipalities.

The funding model introduced by the Quadrilatero project, now is in part regulated by ordinary Law⁵, making then possible to transfer this experience in other investments for transport infrastructure.

The application of “Eurovignette” as a form of *cross modal* funding

The Directive 1999/62/EC (as modified by the Directive 2006/38/CE) – concerning the “charging of heavy goods vehicle” and better known as “Eurovignette” Directive – proposes to *harmonise levy systems - vehicle taxes, tolls and charges relating to the use of road infrastructure - and establishes fair mechanisms for*

⁵ Legislative Decree n. 189/2005

charging infrastructure costs to hauliers, on the base of the principles that “who uses pays” and “who pollutes pays”.

In Italy this Directive is now mentioned in the paragraph 1017 of the 2007 finance act (law 296/06), in which it is affirmed that the Italian Government commits its-self *to identify the parts of the national highway network where the dispositions of the directive are applied, and sets that the revenues collected by the implementation of the directive have to be used for the investments in the railway system*, therefore as a form of *cross modal* funding. In parallel, paragraph 1022 establishes the issuance of a fund aimed at financing rail infrastructures. The fund has to be fed by a mark-up of road tolls, applied to specific portions of motorways. Therefore, the “Eurovignette” Directive aims at internalising indirect costs caused by big road infrastructures such motorways, in order to finance infrastructures, such as railways, that can contribute in reducing negative externalities on the concerned axis by shifting traffic from the road, or at least constituting the necessary precondition by which the foreseen traffic increase can be captured by rail.

The implementation of this directive can take place by both the introduction of road tolls and the introduction of user charges, but not in a cumulative form (except in the case of bridges, tunnels and passes).

TOOLS		
Possible mark-up of tolls if they are exceptional cases and if it concerns infrastructures:		
- located in mountain regions,		
- that are subjects of acute congestion, affecting the free movement of vehicles, or		
- where vehicles cause significant environmental damages.		
The mark-up of tolls can be applied if:		
- the revenue generated from the mark-up will be invested in priority projects of European interest, identified identified in Annex III to Decision No 884/2004/EC., that contribute to reduce congestion or the environmental damages;		
- the projects concern infrastructures located in the same corridor of the road where the tools are raised.		
The mark-up of tools cannot exceed:		
- 15% of weighted average tools (in most of cases)		
- 25% of weighted average tools when the revenues are invested in cross-border sections of priority projects of European interest involving infrastructures in mountainous regions.		
USER ANNUAL CHARGES		
Determined by each Member. The amount has not to go over the maximum established amount:		
	Maximum three axles	Minimum four axles
Euro 0	1.332	2.233
Euro I	1.158	1.933
Euro II	1.008	1.681
Euro III	876	1.461
Euro IV and less pollutant	797	1.329

Brenner Base Tunnel

The Brenner rail Base Tunnel, 56 Km long, is the heart of the 2.200 km long rail corridor from Berlin to Palermo via Munich, Verona and Bologna.

The total investment cost for the Base Tunnel amounts to over 4,000 MEuros, and the project may benefit from TEN-T grants up to 20% of the total cost.

In order to contribute to the project implementation, the Italian Brenner motorway concessionaire, since 1998, has issued a fund made of a share (about 30 Meuro per year) of road tolls collected year by year. Up to now, the fund sums up to about 300 Meuro. The fund issuing was permitted by National Law, the Balance Act for 1998⁶, and it represents the first Italian case of *cross-modal* financing, started almost at the same date as the Swiss Alptransit public funding model.

This fund could of course exist even if the “Eurovignette” cross modal financing was applied: according to “Eurovignette” Directive, the Brenner Base Tunnel can be partly financed by a mark-up on road tolls for heavy vehicles on Brenner motorway, destining those extra revenues to the construction of the tunnel.

Indeed, in respect of the Directive’s statements: (i) an exceptional case, (ii) a motorway located in a mountain region (iii) a motorway provoking congestion and strong environmental damages. Moreover, the extra revenue would be destined to the realisation of a priority European project, listed in the Directive itself. According to the actual heavy traffic performance on the motorway and to the maximum increase allowed by the Directive, a yearly “Eurovignette” extra revenue of about 35 Meuro can be estimated. The following simulation (Figure 9) shows a hypothetical financial scenario in which the promoter of the Brenner Base Tunnel raise initial funds for the construction with a loan covering the total investment cost, at a 6% fixed interest rate. Even considering the above-mentioned TEN-T fund and summing up the “Eurovignette” fund to that issued by Italian law in 1997, the application of “Eurovignette” does not help significantly in covering the yearly instalments required for serving the debt.

⁶ Law n.449/97.

In other words, the Brenner case is representing an almost common situation of Alpine road infrastructure which, although presenting congestion from heavy traffic in part of the year, does not have enough heavy traffic to constitute an effective application case of “Eurovignette” model for cross-modal financing.

Figure 9: Simulation concerning the Brennero Base Tunnel investment

Total investment costs								
4.000.000.000								
	2008	2009	2010	2011	2012	2013	2014	2015
Yearly instalments	265846143,7	265846143,7	265846143,7	265846144	265846144	265846143,7	265846143,7	265846143,7
Loan characteristics								
Amount	4000000000							
Interest rate	0,06							
Duration (years)	40							
Installment	40							
Financial sources								
Italian Law 449-97 fund		395000000	31000000	31000000	31000000	31000000	31000000	31000000
Eurovignette						35100000	36153000	37237590
TEN-T grant		480000000						
Non covered requirement*								
	2008	2009	2010	2011	2012	2013	2014	2015
Requirement per year	-609153856,3	234846143,7	234846143,7	234846144	199746144	198693143,7	197608553,7	196491426
Cumulated requirement	-609153856,3	-374307712,6	-139461569	95384574,7	295130718	493823862,1	691432415,8	887923841,8

* a negative amount represents a temporary over coverage

	2016	2017	2018	2019	2020	2021	2022	2023
Yearly instalments	265846143,7	265846143,7	265846143,7	265846144	265846144	265846143,7	265846143,7	265846143,7
Financial sources								
Italian Law 449-97 fund								
Eurovignette	31000000	31000000	31000000	31000000	31000000	31000000	31000000	31000000
TEN-T grant	38354717,7	39505359,23	40690520,01	41911235,6	43168572,7	44463629,86	45797538,75	47171464,91
Non covered requirement*								
	2016	2017	2018	2019	2020	2021	2022	2023
Requirement per year	195340784,5	194155623,7	192934908,1	191677571	190382514	189048604,9	187674678,8	186259534,8
Cumulated requirement	1083264626	1277420250	1470355158	1662032729	1852415243	2041463848	2229138526	2415398061

Conclusions

In this work, starting from the concept of externalities, we have investigated the rationale at the basis of the most innovative infrastructure funding models recently developed in Italy. Subsequently we have described in detail the most innovative methods that we have identified: the “take over contribution”, the “land value capture” and the “Eurovignette” as a form of cross modal funding.

The first analysed method, the “take over contribution”, allows to the transport infrastructures’ projects that have to be built and managed in project financing but have a concession period shorter than their lifetime, to be anyway profitable. As we said, the profitability of infrastructures realised in project financing derives from the application of price’s mechanisms, based on the direct benefit generated from the infrastructure on the users. In this paper we have tried to model that tool, first theoretically and secondly empirically, analysing the cases of Pedemontana and Bre.Be.Mi.

Moreover, the “land value capture”, using appropriate mechanisms, “channels” the indirect benefits generated from a transport infrastructure on the land value in the area affected by the infrastructure. In the analysed case, the Quadrilatero project, those benefits are monetized mainly thanks to the Plan of Wide Area that realises an interrelation between the road and the territory and therefore increases the transport infrastructure’s benefits.

Finally, the “Eurovignette” Directive allows to fund the improvement of the railway system with the revenues that derive from the application of user charges or from the rise of tolls in some highways. Therefore, the Directive aims to internalise part of external costs generated by road traffic and to use them to fund other transport infrastructures, as railways, that allow to decrease part of the negative externalities to which they refer (in this case we can then speak of cross modal funding). However in this paper we have showed that the annual amount generated by the increase of Brennero highway’ tolls can cover only a part of the funds necessary to make the Brennero Tunnel.

We precise that the application of one method does not exclude the application of another one, so as to make possible the contemporary application. If an infrastructure’s investment was realized applying these three methods, at least part of externalities would be correctly monetized and utilized to finance the infrastructure itself.

The application or not of the analyzed methods mainly derives from the characteristics of the transport infrastructure and of the territory. For example, the accomplishment of the “take over compensation” is related to the infrastructure lifetime, and to the cash flow generated from its exploitation; the implementation of the “land value capture” is related to the availability or not of areas to be developed; and the putting into effect of “Eurovignette” Directive as cross modal funding source is possible if the constraints imposed by the Directive are fulfilled, and if the amount of “internalised” externalities are significant for triggering investments for less pollutant infrastructures.

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