Roundtable

Broadening the Scope of Transport Appraisal to Capture the Full Impact of Investments

Analysis of the system of transport appraisal implemented in France and some methodological innovations

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The main points of the report

1. Stages of the quest to identify the full impact of investments in France

2. The legal obligation of ex-post evaluations and the "LOTI balance sheets"

3. Some lessons learned from the "LOTI reports" for motorway projects

4. Some lessons learned from the "LOTI reports" for high-speed lines

5. The "LOTI balance sheets" and broader economic effects

6. The usefulness of permanent observatories illustrated with a few examples

7. The example of the Socioeconomic Observatory of the LGV SEA

8. Spatial equity and redistribution

9. Optimal ranking and ex-post evaluation of the ranking of an investment program

1. Stages of the quest to identify the full impact of investments in France (and integrate them if possible into the CBA)

1844, Seminal article of Jules Dupuit

In the 1960s, effects on safety

In the 1970s, environmental effects

In 1982, ex post evaluations became mandatory (Balance sheet)

In the 2000s, risk analyses, scarcity coefficient of public funds,...

Since 2005, the criterion of the optimal ranking of investments

(Note that since the 70s, the WEB was not neglected but was considered as not translatable in monetary value)

2. The legal obligation of ex-post evaluations and the "LOTI balance sheets"

From the 1982 law, ex post evaluations of large transport projects (today cost> 83 million euros) became compulsory.

With three objectives:

To inform the public on the project, in particular on the divergences between the observed results and the forecasts.

To report on the use of public funds by evaluating ex post the economic, social and environmental effectiveness of the investments made.

To provide feedback for improving the ex ante evaluation methods for future projects

3. Some lessons from the "LOTI reports" for motorway projects

Traffic was more often underestimated than overestimated by forecasts, especially after the 2000s.

Disappointments with regard to ERRs (economic IRRs), observed in one out of two cases, are generally due to uncontrolled costs.

The lessons of LOTI reviews on WEBs are relatively limited, except when permanent observatories have been set up.

3. Some lessons from the "LOTI reports" for motorway projects

Effects on forecasts

Figure 1 : Difference between observed motorway traffic and traffic forecast
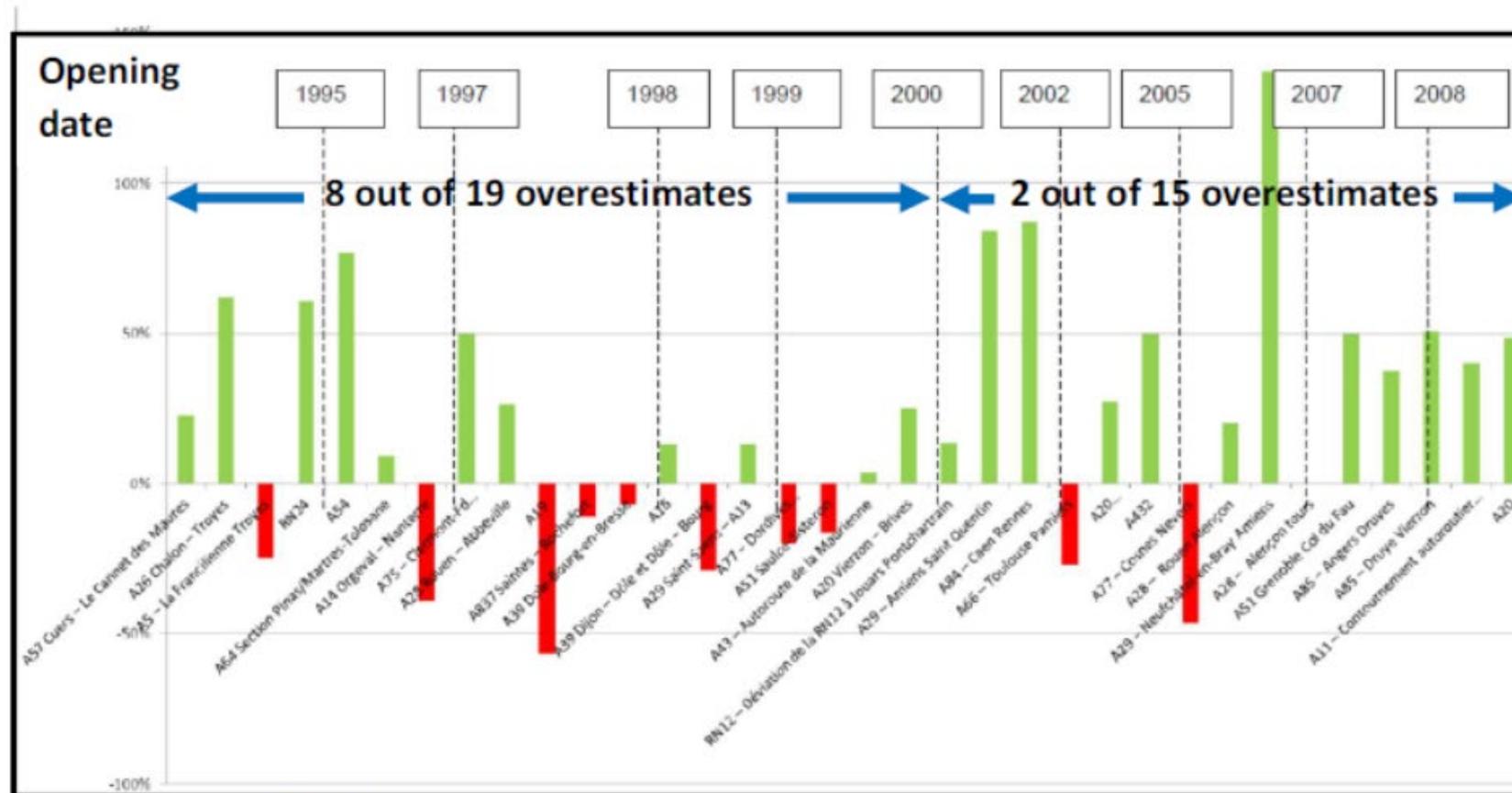
Source : CEREMA (2018)

4. Some lessons from the "LOTI reports" for high-speed lines

Economic and financial Internal Rate of Return: Comparison between ex-ante and ex-post evaluations

High Speed Line	Atlantique		Nord-Europe		Ile-de-France (Bypass of Paris)		Rhône-Alpes (Bypass of Lyon)		Méditerranée		Est (Paris-Strasbourg)	
Commissioned in	1992		1993		1994		1994		2001		2007	
Profitability	ERR	IRR	ERR	IRR	ERR	IRR	ERR	IRR	ERR	IRR	ERR	IRR
Ex-ante	23,6 %	12,9 %	20,3 %	12,9 %	14,1 %	22,3 %	14 %	9 %	11 %	8 %	8,5 %	7,2 %
Ex-post	14 %	8,5 %	5 %	2,9 %	6,9 %	15 %	10,6 %	6,1 %	8,1 %	4,1 %	4,2 %	5,9 %
Difference	-9,6 %	-4,4 %	-15,3 %	-10 %	-7,2 %	-7,3 %	-3,4 %	-2,9 %	-2,9 %	-3,9 %	-4,3 %	-1,3 %
Main explanations	Traffic and revenue higher than forecast but strong drift in all costs (over 20%).		Traffic lower than forecast. With increased prices, revenue almost confirmed but +20% in costs.		Traffic below forecast and drift in rolling stock and operating costs.		Traffic below forecast and drift in rolling stock and operating costs.		Traffic below forecast and drift in rolling stock and operating costs.		Cost drift (+ 20 %) partially offset by higher than expected traffic.	
Delay in commissioning	13 %		7 %		50 %		9 %		75 %		28 %	

Source: CGEDD (2018), LISEA (2018) and author's calculations

5. The "LOTI balance sheets" and broader economic effects

The files preceding the official "declaration of public utility" generally mention elements that make projects attractive. It is therefore necessary to compare what is observed after commissioning with what was expected.

For direct jobs, for example, only one in 6 HSLs was the subject of a precise observation of the jobs created.

LOTI reports provide little information on WEBs and they are often disappointing when they are provided.

LOTI reports are often reduced to picking up elements from academic studies which have been carried out at the initiative of local research institutes (except when the project company has set up a permanent observatory).

6. Usefulness of permanent observatories illustrated with a few examples

The three handicaps of retrospective studies:
- The ephemeral nature of certain mechanisms.
- The evaporation of data.
- The loss of memory of the actors involved.

A dozen permanent observatories for motorways.

None of the six LOTI high-speed line reports has benefited from a permanent observatory. Only more recent projects are concerned.

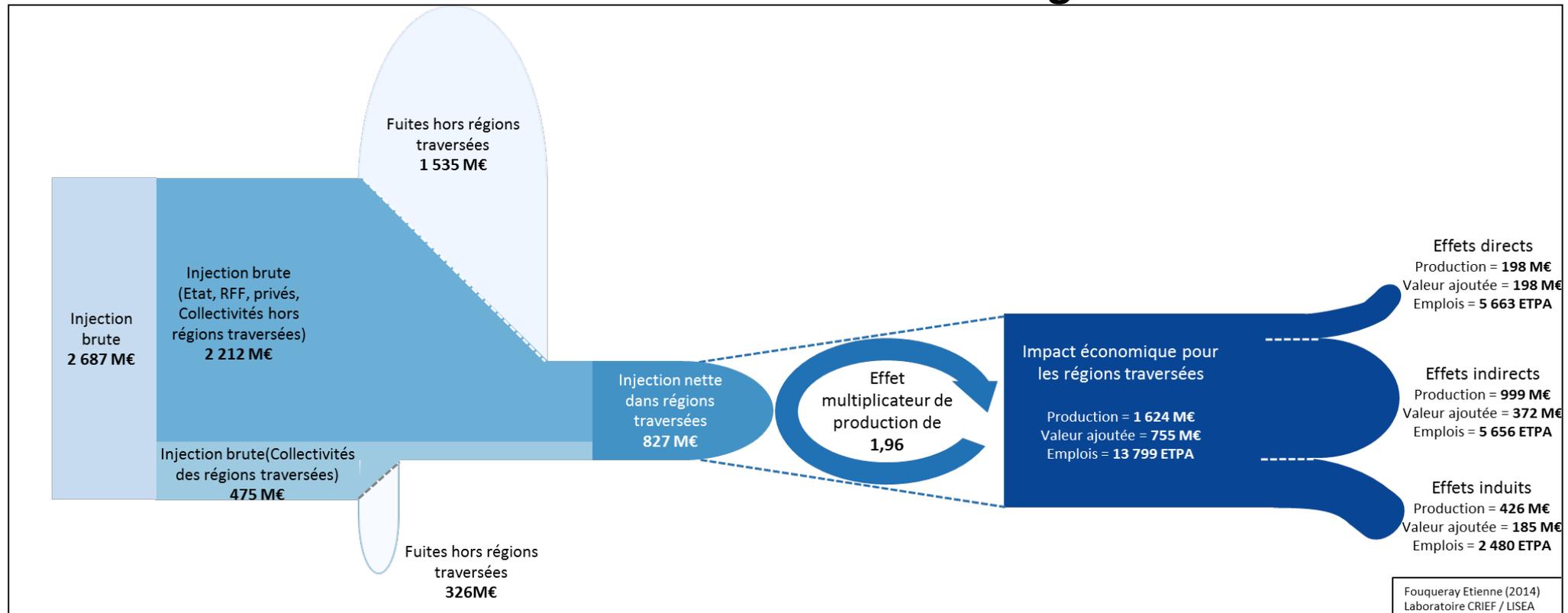# 7. The example of the Socioeconomic Observatory of the LGV SEA

After six years of work, the LGV Sud-Europe-Atlantique was open in July 2017. Comprised of 302 kilometers of high-speed line and 38 kilometers of connections, it cost 7.7 billion euros with public funding by 51%.

The concession contract provides for the organization and financing of a permanent observatory by the concessionaire.

This observatory was set up 5 years before commissioning and it should operate until 2027.

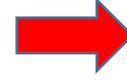# 7. The example of the Socioeconomic Observatory of the LGV SEA

An example of a response to ephemeral mechanisms:

The economic effects of the work on the region crossed

Fouqueray Etienne (2014)
Laboratoire CRIEF / LISEA

For € 1,000 million injected ➡ **326 million in the region crossed** ➡ **+ 604 million regional production** ➡ **13 800 jobs (one year job)**
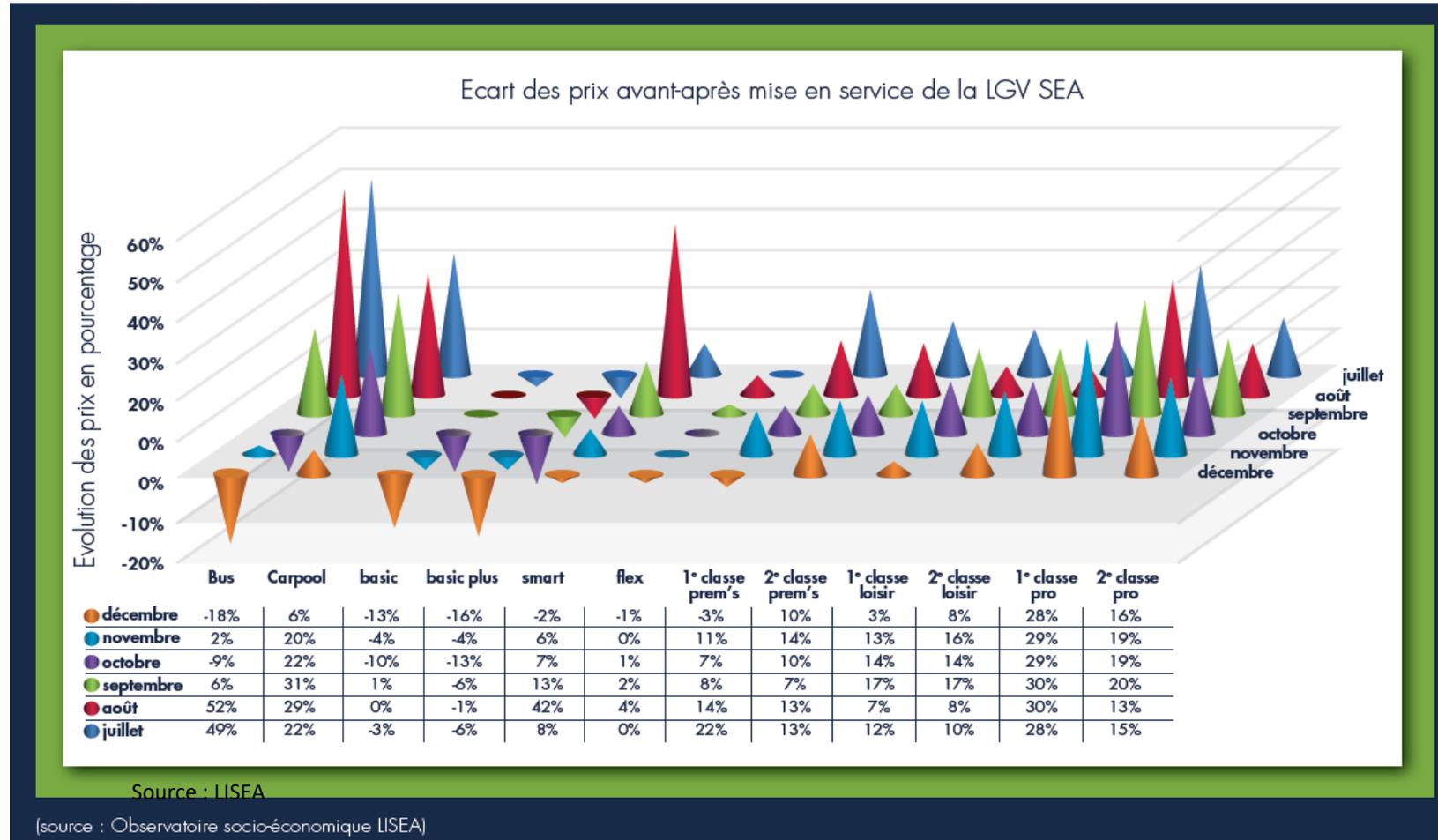
7. The example of the Socioeconomic Observatory of the LGV SEA

An example of a response to data evaporation:

Fares compared for different modes when the HCL came into service in July 2017

(Change compared to the same month in 2016. Basic and Smart are air fares)

Ecart des prix avant-après mise en service de la LGV SEA

	Bus	Carpool	basic	basic plus	smart	flex	1° classe prem's	2° classe prem's	1° classe loisir	2° classe loisir	1° classe pro	2° classe pro
décembre	-18%	6%	-13%	-16%	-2%	-1%	-3%	10%	3%	8%	28%	16%
novembre	2%	20%	-4%	-4%	6%	0%	11%	14%	13%	16%	29%	19%
octobre	-9%	22%	-10%	-13%	7%	1%	7%	10%	14%	14%	29%	19%
septembre	6%	31%	1%	-6%	13%	2%	8%	7%	17%	17%	30%	20%
août	52%	29%	0%	-1%	42%	4%	14%	13%	7%	8%	30%	13%
juillet	49%	22%	-3%	-6%	8%	0%	22%	13%	12%	10%	28%	15%

Source : LISEA

(source : Observatoire socio-économique LISEA)

7. The example of the Socioeconomic Observatory of the LGV SEA

An example of a response to the loss of memory of the actors involved :

**The role of the new line in the behavior of actors in the territories concerned
(The construction of the line being known since 2012)**

The role of the High Speed Line in the development policy of station neighborhoods.

**The HSL and the location of new digital and consulting companies.**

**The distribution of roles in the network of the cities concerned
(metropolisation vs diffusion)..**

Etc.

8. Spatial equity and redistribution

ΔS_i is the portion of user surplus benefiting the inhabitants of each zone i.
Two fictitious projects are represented by two figures on which the zones i are arranged according to the increasing values of their accessibility A_i relating to the ex-ante situation.

Profitability *vs* spatial equity

(Fictitious values)
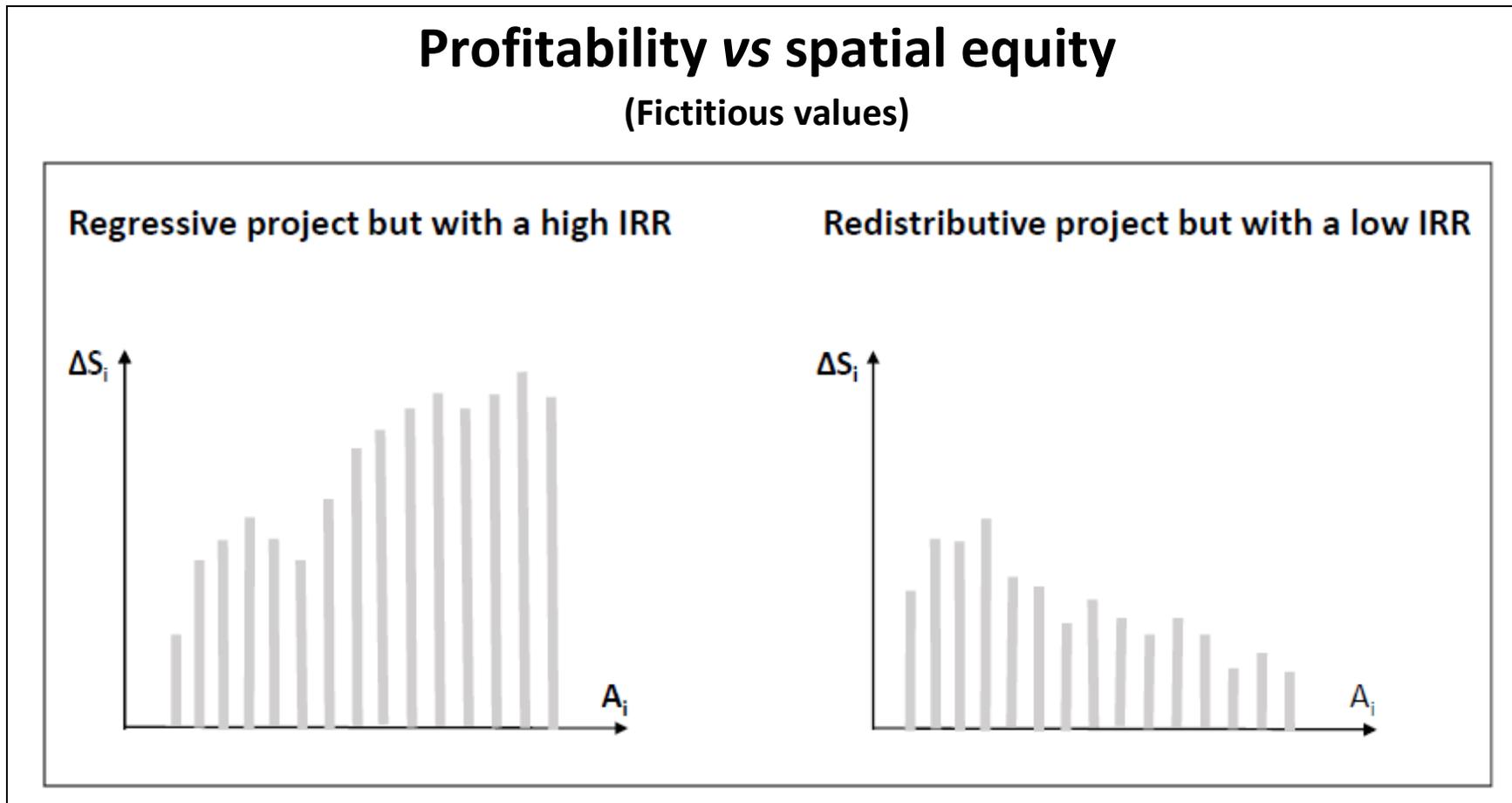
8. Spatial equity and redistribution

From the standard assessment...

The variation of the welfare function linked to a given project is formalized by the classic relationship:

$$\Delta W = \Delta R + \Delta C + \sum_i \Delta S_i$$

ΔR represents the variation in revenue linked to the project
ΔC the variation in monetary costs
ΔS$_i$ the variation in surplus from which the inhabitants of zone *i* benefit.

This equation assumes that the decision maker is indifferent to the distribution of surpluses between zones *i*.

8. Spatial equity and redistribution

…To the suggestion from neo-utilitarianism

The variation of the welfare function becomes:

$$\Delta W = \Delta R + \Delta C + \sum_i \Delta S_i . A_i^{-\alpha}$$

If α> 0, the variation in surplus *ΔSi* is thus overweighed when accessibility *Ai* of the zone *i* is low.

The aversion to spatial inequality is thus expressed by the sole value of the parameter α

(and we find the standard equation of the CBA when α = 0).

Recall of a previous proposal:

In the Round Table on "Efficiency in Railway Operations and Infrastructure Management" (2014) we suggested an indicator of global efficiency of a program of investments:

IGE = $\Delta W / \Delta W$o

Where ΔW is the variation of the welfare function due to the realization of the real program and ΔWo the variation of the welfare function that the optimal program would have provided.

This optimal program is easily established by assuming the projects selected in decreasing order of the ratio (ΔW / *Subsidy*) under the budgetary constraint of the subsidies paid every year in the real program.

9. Optimal ranking
and ex-post evaluation of the ranking of an investment program

A first concrete example on a 12-year investment program:

	Ranking optimal	Actual Ranking	with the only positive NPV projects
Net Present Value of the program	1270	110	1175
IGE of the program	100%	9%	92%

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