Workshop
"Recent Advances and Challenges in Benefit---Cost Analysis"

Toulouse, December 15---16, 2014

New trends in French CBA

Emile Quinet
Paris School of Economics-Ecole des ponts ParisTech

The framework

- In France, as in many EU countries, CBA is mainly used for the assessment of public investments in transport.
  - Every important transport project is assessed through codified procedures
  - Almost no use of CBA in other sectors, nor for regulation or pricing
- Guidelines are regularly updated
  - Last updating took place 1 year ago
  - A collective work including:
    - Scholars
    - Professionals
    - Public service agents
    - NGO such as environmental associations or trade unions
  - Not limited to transport, though transport takes the main part of the report

Downloadable from: www.strategie.gouv.fr

Changes in unit values

- Statistical value of life is increased from 1,7 M€ to 3,0M€
- Consequently, value of pollution and noise is increased in due proportion
- Value of time decreases! Smartphone effect?
- No monetisation of biodiversity …at least for the present
- Raising – but not solving- the issue of the value of agricultural land

Enlarging the scope of consequences

- General idea:
  - Usual partial analysis provides total welfare
    - But not the break-down which is of interest for the decision makers
    - Furthermore under assumptions which are not fulfilled
- Addressed effects: some add to the surplus, other are already included:
  - Market power and imperfect competition effects
    - Lerner index correction for general imperfects competition
    - Focus on strategic reactions in the transport sector (e.g.: competition air-HSR)
  - Macro-economic consequences (growth, employment):
    - Use of macro economic models
    - Caution about the effects of investments on growth and employment
  - Spatial location of activities:
    - Assess changes in location through LUTI models
    - Problem of interagglomeration migrations
    - Productivity linked to density/accessibility
  - Distribution effects
- General direction: the need to embed CBA in a larger framework than partial analysis

Uncertainty: systemic risk and discounting

- The problem: to take into account the random walks of surpluses drawn from an investment and of GDP
  - Around fixed trends, the higher the future GDP, the lower the utility of future surpluses expressed in Euro
  - The expected utility of a future surplus depends on the level of GDP, on the degree of risk aversion and on the correlation between the surplus and GDP
  - The analysis comes to a result similar to what is commonly used in finance
- Recommandations based on Gollier 2010

Uncertainty: systemic risk and discounting

- The discount rate to be used for a project is specific to each project; it embeds the systemic risk of this project:

$$r = r_f + \varphi\beta$$

- where
  - r is the risk-factored discount rate specific to the project,
  - r_f is the risk-free rate, set by the report at 2,5%
  - φ is the general risk premium, set by the report at 2%
  - β is specific to each project and measures the correlation between the surpluses generated by the project and the GDP
- The coefficients β are estimated: they lie between 1,00 (for urban public transport) and 1,50 (for intercity long distance transport)

Long term issues:The need for a long term strategy

- Infrastructure investments have a long life-time (often several hundred years)
  - Lifetime needs to be extended to longer time span:
    - The recommandations:
      - A common horizon : 2070
      - An increased residual value : 70 times the last year surplus
      - The specific case of carbon price
- CBA is carried out at the margin of a trajectory (reference scenario)
- Due to the ongoing transitions, these reference scenarios cannot be extrapolated from the present trends (problem of relative prices evolutions):
  - They should not be limited to growth rate
  - They should include prospective views on:
    - Ecological, energy and environmental transitions
    - GHG abatement mix
    - possible mobility changes:
- They need to be standardized in order to make CBA comparable from one project to another
- Yet to be set up….

Decision rules for program optimisation (B Lapeyre, Tuesday)

- The issue:
  - When should a project be implemented, if it is to be?
- The three criteria:
  1. Maximize the expected NPV
     - A difficult problem in situation of risk
       - Real option
     - Simple rule: A(T)/C=0,045
  2. Ensure that in that case, the expected NPV is positive
  3. Regularly repeat as long as 1 and 2 are not reached

$$\underset{T \text{ t.a.}}{Max}\{E[NPV(T)]\}$$

Implementation and use issues

- What we observe:
  - CBA plays a (very) limited rôle
  - It do not answer the questions of decision-makers
  - It differs in the importance to environment
  - Not trust in traffic modeling
- Remedies:
  - Communication
  - Expertise to ensure robustness

Implementation and use issues

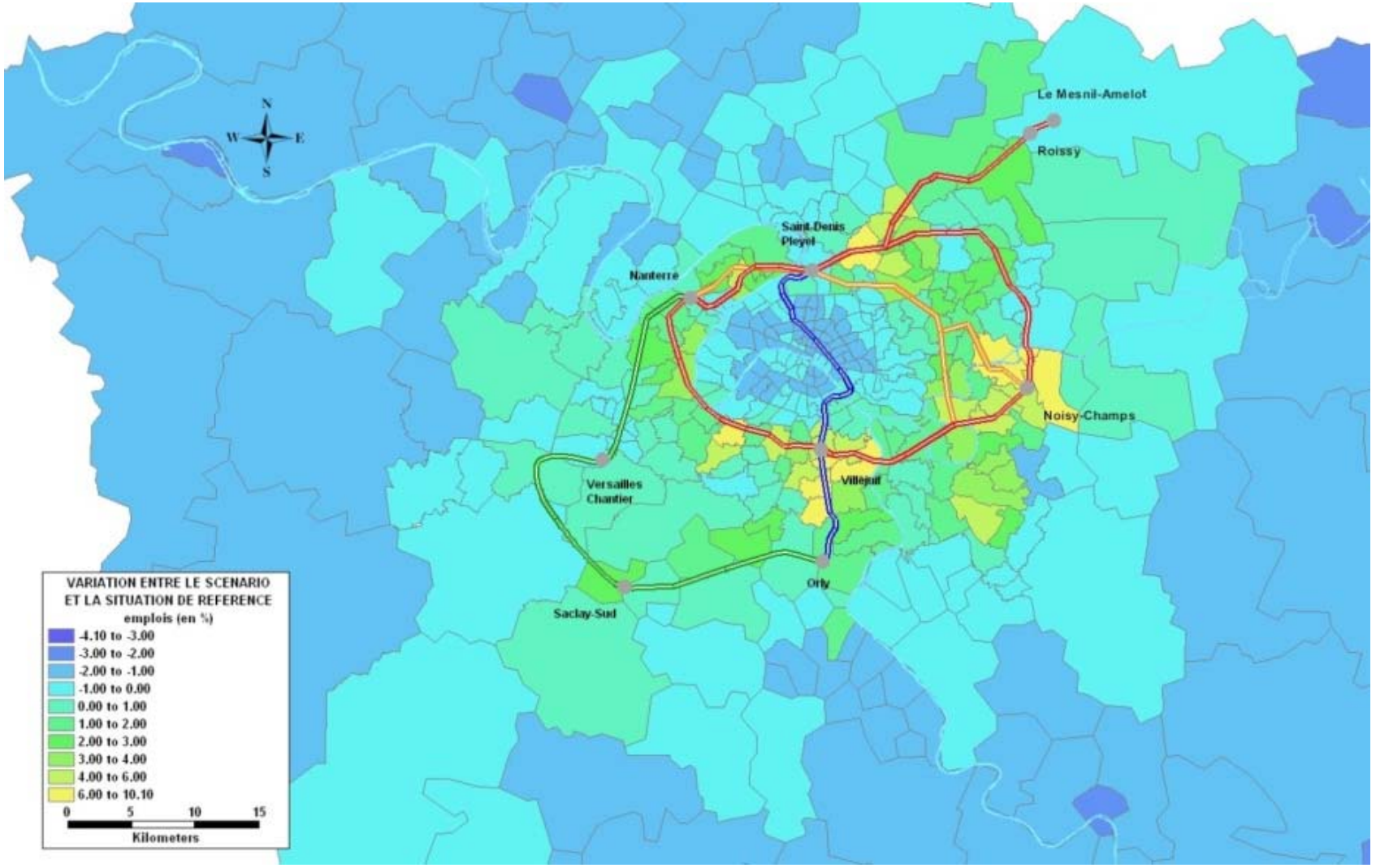
- On top of that:
  - CBA does not provide the optimal solution
  - Depends on the process of projects generation and screening
    - Once a project has gained respectability and political support, it is difficult to skip it
  - Some subjects are tabu: pricing
  - Not much variants

Conclusion: work for the future

- Technical and implementation issues:
  - Traffic modeling, Surplus reckoning
- Research issues:
  - Macro-economics and spatial effects (CGEM, LUTI…)
  - Discounting and uncertainty; carbon price
  - Imperfect competition issues
- Political issues
  - Long term perspective/prospective and reference scenarios
  - Improve communication, make consequences more explicit
  - Make CBA reliable

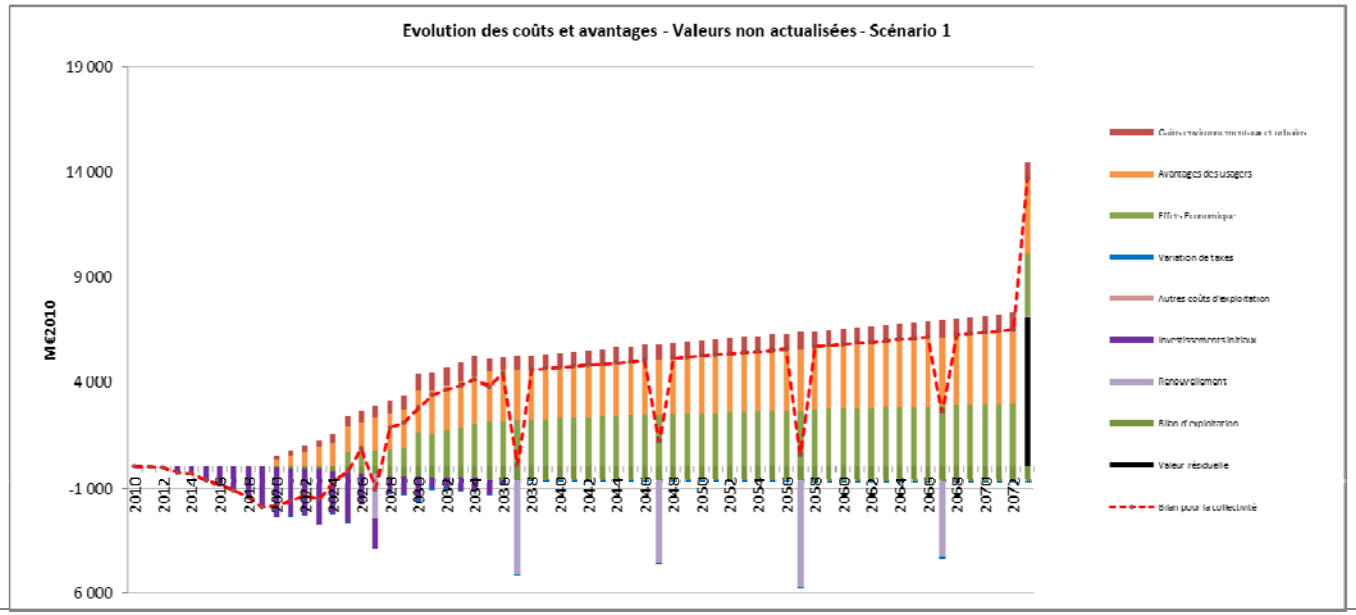
Implementation for the « *Grand Paris Express* » case

The *Grand Paris Express*: changes in employment through Pirandello

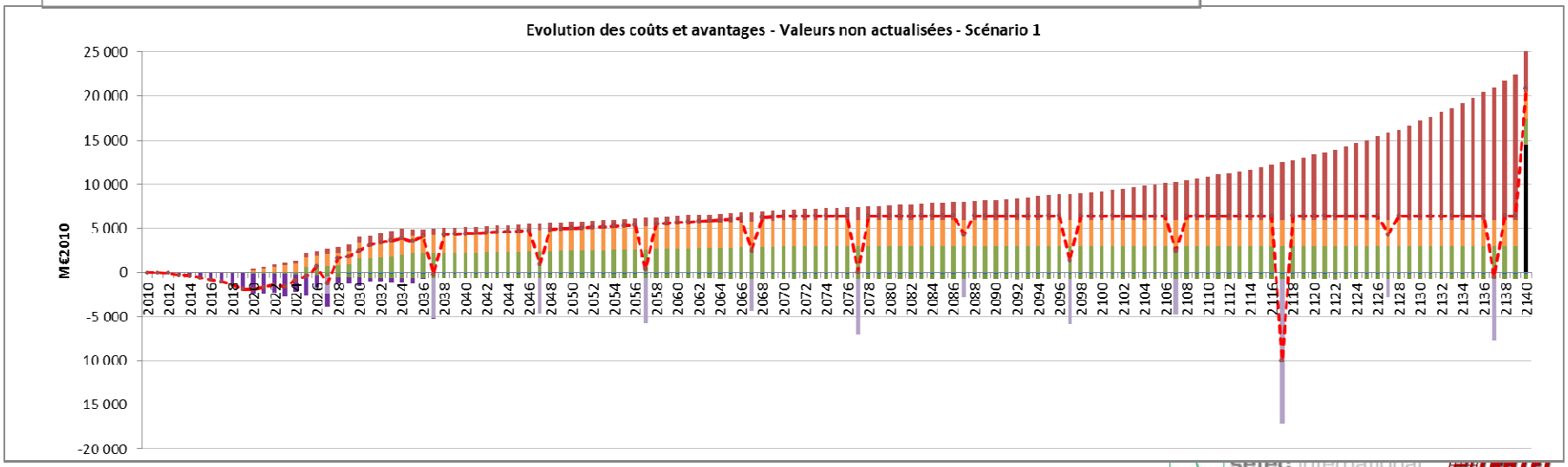


Advantages and costs

De Robien



Quinet



Cost Benefit Analysis

Former procedure			
Advantages	S1 (Md€2010)		
	2025	2035	NPV
Time savings	1,0	1,9	27,6
reliability	0,2	0,2	3,4
Comfort	0,1	0,2	2,2
Environmental and urban effects	0,5	0,7	10,4
Spatial effects: changes in location	-	-	-
Spatial effects: changes in density	-	-	-
Employment effects	-	-	-
Total Advantages	1,7	3,1	43,6

New procedures			
Advantages	S1 (Md€2010)		
	2025	2035	NPV*
Time savings	0,9	1,8	21,8
Reliability	0,2	0,2	3,1
Comfort	0,0	0,1	0,7
Environmental and urban effects	0,4	0,6	12,6
Spatial effects: changes in location	0,0	0,5	4,6
Spatial effects: changes in density	0,0	0,6	5,4
Employment effects (fiscal wedge)	0,0	1,1	10,4
Total Advantages	1,5	4,8	58,6

NPV in Md€ 2010	Former	New
Pollution	0.3	-0.9
Safety	0.5	1.0
Carbon emissions	2.9	6.5
Noise	-0.0	0.2
Urban effects	6.7	5.7
Total	10.4	12.6

* Valeur actualisée à l'année 2010 en Md€2010