



# Ex post analysis and tools - what should you expect?

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- Ex-post at project level: a case from the Netherlands
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# Introduction

- Transport investments projects are quite costly but there is a general lack of ex-post analysis of their actual societal impacts.
- Objective of paper:
  - To present the variety of methods of analyses and tools that have been developed for ex post measurement of societal impacts. Our three examples from the Netherlands, France and United States show three different levels of analysis and different types of measurement.
  - To learn from these examples: how to expand the use of ex-post analysis and how to optimize the insights from the ex-post analysis.



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# Ex-post evaluation practice in the Netherlands

- For transport infrastructure investments, an ex-ante cost benefit analysis(CBA) is mandatory. There is a guideline to ensure consistency.
- An ex-post CBA is considered usefull but is not mandatory. Evaluation of government spending on an aggregate level is mandatory every 3-5 years but does not include CBA.
- KiM initiated several activities to promote the use of ex post analysis on a project level, by means of CBA:
  - Overview of ex-post use in several countries, with inventarisation of advantages and best practices
  - Case study of a road project (together with PBL)
  - Guideline (not compulsory) fold-out map with the essentials of ex post evaluation based on CBA with do's and don'ts.



## Case study highway A5

- 7 km's of new highway, close to Schiphol airport (Amsterdam)
- Calculations from 1989, project decision in 1997, project ready in 2003
- Impacts:
  - Mobility: increase on traffic on A5, decrease on A4 and A9. Estimated reduction of congestion could not to be compared due to the inability to replicate original measurements and indicators for congestion reduction.
  - Nature, environment and safety: environmental impacts were estimated conservatively due to underestimation of technological developments. The emissions were lower than expected beforehand. The safety increased, however unclear if this is due to the impact of the A5 or other factors.
  - Costs were lower than expected beforehand, but the project was also somewhat downscaled.



## Conclusions from case study on project level

- The long time between the project report and finalisation (14 years) hampers the comparison of impacts as the time horizon of the calculations ended before the year of finalisation.
- The project showed growth effects until the 5<sup>th</sup> year after opening, possibly linked to delays in behavior changes. It is best to make measurements after 5 years and not much earlier.
- The policy indicators and data collected should be adaptable for future use. In this case study, the policy objectives and the way they are measured changed in a rather irreversable way.
- The scope of the project was bigger in 1989, than what was actually realized. On the level of the actually realized part of the project, no data were available.



# Road ahead for ex-post analysis of infrastructure in the Netherlands

- There is no standard for ex-post analysis. Various methods are used (f.i. CBA, MCA, effectiveness measurements), subjects (process, costs, traffic forecasts, various types of benefits) and scope (policy objectives, programmes, projects)
- Other types of ex-post evaluations than those based on CBA are more common, for instance process management, government accounts, projected costs, traffic forecast.
  - *It is therefore necessary to decide upon and clearly communicate what type of ex post evaluation is necessary and make this part of standard procedure.*
- A large scope of projects covered by ex-post studies could increase the motivation, since it would greatly increase feedback possibilities to improve the quality of ex-ante assessments, see next case from France!
  - *In Netherlands we try to standardize ex-post evaluation by topic (for instance costs, or traffic forecast).*



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## Framework and practice of ex-post studies in France

- LOTI law (1982) : ex-post evaluation is made compulsory for (very) big projects (i.e. project level)
- Ex-post study to be made 3 to 5 years after the infrastructure is in operation
- Now regular flow of ex-post evaluations
- possibility for aggregate studies at a higher level
- Aggregate studies facilitated since more or less standard ex-ante and ex-post evaluation methods are used



## Objectives of ex-post studies (project level; as from CGEDD report)

- confront actual outcomes to previsions and explain the differences,
- observe project's effects and when some are negative give suggestions for reducing them,
- verify the owner compelled with their obligations and promises,
- inform the public,
- and give a feedback for future ex-ante evaluations, especially as regards coping with risks and uncertainties



## From project level to aggregate level (1)

- confront actual outcomes to previsions
  - Distribution of differences: regularities? Biases? Small or big dispersion? (*F: transversal studies Taroux § al 2005, SETRA 2008, Meunier 2010, 2012, 2016*)
- and explain the differences: frequent causes? General or project-specific? Impact of evolution of methodology / assumptions?
- observe project's effects
  - Types of impacts (unexpected? feared/anticipated by some stakeholders? Economic, but also environmental)



## From project level to aggregate level (2)

- when some impacts are negative, give suggestions for reducing them:
  - specific or more general lessons? Organisation of feedback?  
(F: case by case, no feedback at a larger scale; see part 3)
- verify the owner compelled with their obligations and promises
  - project specific; but general lessons as regards efficient publication of obligations, « reasonable promises »? (F: CGEDD report on each ex-post study)



## From project level to aggregate level (3)

- inform the public
  - ex-post at aggregate level for who? Ex-ante specialists? Project owners? Stakeholders and the public? Interest for other regions/countries?  
(F: ex-post LOTI studies should all be made public, by the law; CGEDD reports are all on Internet, as are most ex-post LOTI studies)
- and give a feedback for future ex-ante evaluations, especially as regards coping with risks and uncertainties
  - Organisation of feedback? (F: no official feedback process, but technical advice e.g. SETRA 2008, broader views in special annex of Quinet report, creation of users' committee as part as new evaluation framework, and information of scientific committee)



## Some lessons from aggregate studies

- correct risk analyses at the ex-ante stage are key to understanding and taking account of risks in CBA
- regular update of assumptions on evolution of relative prices / unit values used for key parameters (value of time, CO2, ...) but also of performance ratios (average emissions of vehicles, safety performance, ...), consistently with observed trends and public policies which influence these ratios
- Evolution of ex-ante studies' quality?



## Interest of aggregate studies as regards risks and uncertainties

- Observation of assessment “errors”
- Observation of actual expression of risky events for some projects
- But also deeper feedback for operational treatment of risk issues in ex-ante evaluation



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## US initiatives for ex-post: focus on sharing “lessons learned”

- Ex-post experiences began with roads in 1979, developed in the last 2 decades, major development with SHRP in the last years
- Do Forecasts of Economic Development Match Performance?
- Do Investments Support Policy Initiatives?
- Can Project Design Be Improved?

*US experience is grounded in demonstrating how past outcomes support current decision-making. They have focused on the economic development impacts of some of the more controversial types of highway investments (bypasses and interchanges).*



## Strategic Highway Research Program (SHRP2)

- Authorized by US Congress in 2005
  - Recognized need for applied Ex Post methods and analysis of major highway investment projects
- Key Objectives of Transportation Project Impact Case Studies (TPICS) Development Program
  - Determine the changes in the economic systems impacted by transportation capacity investment
  - Provide data and results from case-based analysis to demonstrate impacts of a proposed project
- Part of a Broader Program on Collaborative Decision-making Under SHRP2 Capacity Program
- Led to implementation program sponsored by FHWA and managed by AASHTO



## Features of EconWorks

(<https://planningtools.transportation.org/>)

- Database of 112 Case Studies
  - Designed for “early-stage” planning and developing grounded concepts for highway investment strategies
  - Provides Web-based interactive case study selection and review
  - Identifies transportation and non-transportation factors influencing economic development
- Links to Background Studies and Information
  - Technical papers provide background on TPICS development and methodologies
- User Guides and Handbooks on Using Case-Based Ex Post Analysis
  - Guidance provided for users to show how use TPICS and interpret cases provided in database



# EconWorks Process & Interactive Tool Structure

- Local Data from Interviews
- Project Motivation
- Establish Baseline for Counterfactual Scenario
- Standardization of Case Development Process
  
- Information Provided for Each of Current 112 Cases
  - **Characteristics and Settings**
  - **Pre/Post Conditions**
  - **Economic Impacts** – Estimates on jobs, income and output
  - **Images and Location**
  - **Narrative**
  - **Non-transportation factors**
  - **Resources Consulted**



## Some findings from Original SHRP2 Cases

- Wide variations in job impacts. Most projects produced economic effects, although several projects had no effect
- No individual economic impact measure can capture the range of the economic growth and development effects of all types of projects
- Various types of projects lead to economic impacts at different spatial scales, which unfold differently over time
- Economic conditions and project location (urban/rural) are important factors
- Motivations for projects influence outcomes
- Projects that are coordinated with broader planning and investments tend to produce measurably greater economic impacts



# Implementation of Ex Post Analysis Methods in US

- Expanded the ex post analysis system to **include transit projects**
- Implemented a **program involving state DOTs and MPOs** to develop additional cases for the EconWorks data base;
- Expanded sponsored research
  - **Funding for a new center for ex post research** to lead development and refinement of ex post analysis,
  - **Train academics and practitioners** on the development of case studies supporting ex post analysis,
  - **Develop new and improved methods of ex post analysis,** & oversee the training of case study developers & additional cases
- Revise the underlying meta-analysis to include new cases and refine the tools developed for estimating potential economic development.



## Conclusions from US Experience

- Case-based approach to ex post highlights range of factors influencing economic impacts of investment projects
- Systematic, consistent methodology facilitates comparisons and aids in comparative analysis
- Multiple case study approach to ex post analysis demonstrated on relatively large scale
- Transportation agencies interested and back on-going program of ex post analysis
- Institutionalization of processes expected to:
  - Provide additional cases
  - Assist in better decision-making about long-term economic impacts
  - Foster research, training and improvements in ex ante analysis

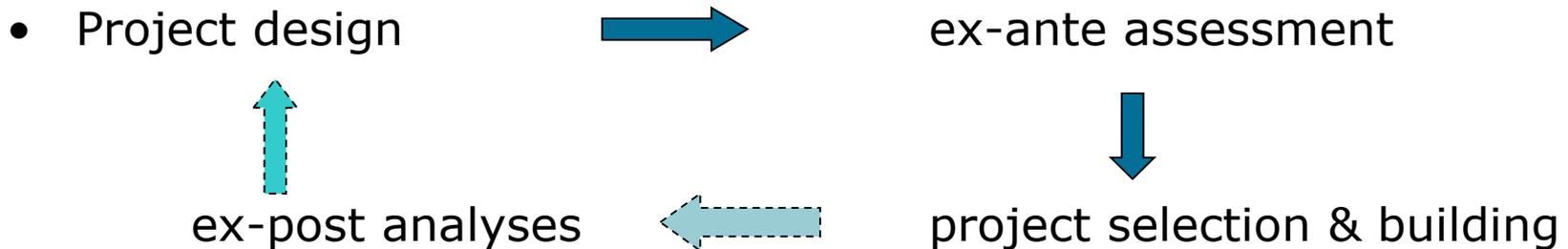


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- Announcing of future ex-post or other external review should motivate higher effort / quality of ex-ante assessments
- Good ex-post analyses need traceable and documented ex-ante studies, organised in view of future ex-post



- Life-cycle at aggregate level



## Existing feedback loops

- Without organised ex-post process, feedback is obtained only via project owner and main contractors' personal experience
  - Pb: long life of projects, increasing variety & complexity
  - very small basis for feedback in terms of number / quality of observations (esp. MT/LT)
- Informal ex-post process at the scale of big consulting companies but « privatised » knowledge (driver= competitive advantage), occasionally professional networking organisations, anyways quite limited since organizing knowledge gathering and sharing needs motivated people, some material means & goodwill of contributing parties
- need for some common driving force that would initiate the ex post analysis process and maintain it on the long term, ensuring availability of data and the capacity for analyzing it and for communicating on the results



# Illustrations of feedback loops & sustainability

- Driving forces in previous examples presented
    - US: initial research investment at first, then combination of national commitment and organization of actors and sponsors, hoping for a snowball effect to maintain the process;  
meta analysis designed to frame assessment of ex ante results (typically from models, but also a number of qualitative assessments) so that project owner's claimed impacts may be backed by evidence and/or, in case of deviations from historical evidence, possibility to get them assessed and properly vetted
    - France: obligation by the law to produce ex-post studies, and also to make them public ; feedback by guidelines updates & general knowledge sharing
  - Once knowledge is available and proven reliable, much easier for a project owner to favor or impose its use on the contractors in charge of the project's design or assessment. When integrated in professional practices, it becomes natural for these contractors to use it and to feed it with fresh data.
- Possible then to build the full life-cycle system



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## Concluding words

- Illustration of 3 types of ex-post approaches
- Besides straightforward comparison of project outcomes to initial objectives and expectations, can also be used to:
  - Inform the accuracy of ex-ante assessment methods
  - Indicate how project design and development can be better informed & could take account of risks and uncertainties
  - Provide valuable feedback for ex-ante project assessment (& communication) when comparing proposed investments to past project types, characteristics, direct impacts and WEI: external evidence to shed “objective light” on claims of projects’ impacts
  - Assess the projects' worth in economic terms.
- More than one standard, variety of outputs
  - ex-post approaches useful for decision makers, project designers, ex-ante study, and more specifically both practitioners and academics
- Possible to build life-cycle systems with organised ex-post, fed and used by project actors themselves with some help from academics



# Thanks for your attention

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