EX-POST EVALUATION OF TRANSPORT INFRASTRUCTURE PROJECTS IN FRANCE: OLD AND NEW CONCERNS ABOUT ASSESSMENT QUALITY

MEUNIER David, Université Paris-Est, Laboratoire Ville Mobilité Transports, UMR T9403 Ecole des Ponts ParisTech INRETS UPEMLV

ABSTRACT

France has expressed the will to develop ex-post analyses of great infrastructure projects for almost 30 years. Indeed, the « LOTI » law adopted in 1982 made compulsory ex-post analyses of very big transport infrastructure projects. These analyses were to be made 5 to 10 years after the infrastructure came into operation. Many years have passed before such ex-post studies were effectively made, and many additional years passed again before these studies were of sufficient quality and number so as to allow their analysis.

The paper presents the main results of a good number of these ex-post studies, underlining what elements appear to be common and what specific considerations may explain the differences between forecasts or appraisal estimates and the actual outcomes that have been observed. Some advice about the «good practice » that would be needed to improve the quality of these ex-post studies are given, together with international comparisons that refer both to meta-analyses such as Flyvbjerg's and to focussed ex-post analyses.

The analysis essentially deals with high speed lines and motorways.

Officials, experts and the public do express growing concerns about transport project assessment (governance, green house gases and more generally sustainable development concerns) or more generally about public choice. The paper considers some of theses concerns and tries to update and enlarge accordingly the lessons and advice extracted from the ex-post studies.

Keywords: ex-post studies, forecasts, LOTI, transport infrastructure

INTRODUCTION

Ex-post studies of operating transport infrastructures are usually considered as being of major interest, both for checking the accuracy and robustness of ex-ante studies and for improving evaluation methods and practices. Nevertheless, not many countries have formal obligations requiring the realisation of such studies, and even less countries do make and publish these ex-post studies.

Yet, some international studies have tried to collect a number of such ex-post observations, one of the most quoted being Flyvbjerg et al (2003, 2005) which presents a great collection of such observations. These international studies have to deal with parameters that are the most common among these available ex-post studies. Thus, they often focus on very few criteria and concentrate on those that are both most common and influential for project assessment: traffic and investment costs.

Other studies, such as Preston and Wall (2008) or Welde and Odeck (2009) are focussed on national projects or more thematic projects. They rely on smaller samples but may go deeper in some analyses and add more parameters to their scope.

This paper relates more to the second family, and presents a good number of ex-post studies made on French transport infrastructures, with a few international cases or comparisons.

The first section presents the French legal framework for ex-post transport infrastructure studies and its current state of implementation with the list of studies considered.

The second section gives the results of usual observations on traffics and costs, compares them to some other national or international studies and discusses some definitions or interpretations that may give hints for deeper analysis on more homogeneous data.

The third section goes a little further into the analysis, considering additional criteria and discussing the questions of reconstitution of model errors versus evolution assumption errors. It tries to deal with some of the new concerns put to light by public debates on transport infrastructures, and with some growing social demands such as sustainable development concerns. Some elements are given on risk and uncertainty, and their peculiarities as regards ex-ante and ex-post studies.

The final section concludes by presenting some advices for ex-ante studies, intended to improve both ex-ante project assessment, and quality and potential of future ex-post studies.

EX-POST STUDIES IN FRANCE

A legal obligation to make ex-post studies for large infrastructure projects was introduced in the French law "LOTI" (Loi d'Orientation des Transports Intérieurs) in 1982. Large transport infrastructures which where officially declared to be of public interest as from summer 1985 had to be subject to ex-post evaluation between 3 to 5 years after they were put in operation. The results were to be made available to the public and to be reviewed by an external audit made by the CGPC (Conseil Général des Ponts et Chaussées), an internal unit of the French transport administration gathering high level experts.

Due to the usual project implementation delays, the production of ex-post studies should have begun from the mid nineties, but in a 2001 report, the CGPC observed that few studies had been realised, and with insufficient quality. A new impulsion was then given, together with a formal clarification and an enlargement of the LOTI ex-post obligations, introducing for instance environmental concerns at the same level as the former purely socio-economic assessment objectives. Now that the process of ex-post studies has been reactivated and has progressively become internalised by the main infrastructure owners, the production of these studies may be considered to have reached its cruise speed, although their publication on the Web is still too rare. Thus, in the last decade, many ex-post studies have been issued, together with the advices given by the CGPC[1].

In 2008, the SETRA published an in-depth analysis of 14 of road infrastructure ex-post studies. In this paper, we will consider a larger set by including rail projects (5 High Speed Lines) and 4 other road projects (see Table 1).

Table 1

Road projects	**Rail projects**
20 projects (of which 16 motorways)	5 projects High Speed Lines
Total length 1900 km	Total length 1100 km
A5 A14 A16 A19 A20 A26 A28 A29 A39 (2 sections) A43 A49 A51 A54 A57 A64 A75 A77 A837 N24 Tunnel du Puymorens	HSL Paris-Nantes HSL Paris-Lille Interconnection HSL Paris HSL Rhône-Alpes HSL Méditerranée

USUAL OBSERVATIONS: COSTS, TRAFFICS

The most common parameters observed in international studies are costs and traffics: do the observations made in France differ from international observations?

[1] Due to a re-organisation of the central administrative structures in France, the CGPC has joined a new entity called Conseil Général de l'Environnement et du Développement Durable (CGEDD).

Costs are generally under-estimated, but what is the benchmark?

The comparison of observed costs with the costs estimated at time of project approval does gives results that are similar to international studies' results but deserve some comments. Figure 1 shows the distribution of cost differences observed at the time of decision, when the public enquiry takes place; making the result of project studies is available to a large public (distribution named "LOTI DUP" in figure 1), and the official decision to build is taken after this public enquiry (the project is declared to have to be made for public utility reasons).
The results of Flyvbjerg et al (2003) are shown in parallel.

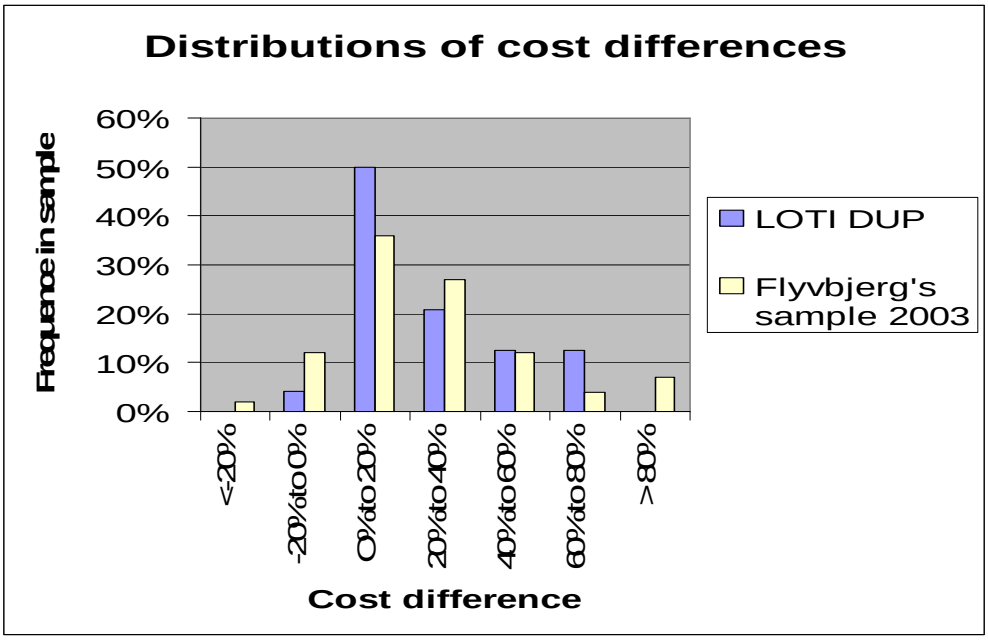

Figure 1

The LOTI data set gives a slightly less spread distribution, but the size of the sample is ten times less than Flyvbjerg et al' s, thus we can conclude not much more than to the similarity of both distributions, a conclusion which already has some interest. But what becomes more interesting is to try to explore one of difficulties mentioned in these studies: the definition of the reference for cost evaluation. Indeed, there is a question of interpretation when using the international convention that defines cost development as the difference between actual and estimated costs in percentage of estimated costs: estimated costs are defined as budgeted, or forecast, costs at the time of decision to build the project, but when exactly is this time of decision? Flyvbjerg et al (2003) discuss this point:

> Ideally, we would calculate cost development on the basis of the cost estimate at the time of the real decision to build. However, in most cases, it is virtually impossibly to identify the specific, real decision date.

We have chosen the DUP estimates, but sometimes the public enquiry comes to the conclusion that adjustments should b made to the project, implying in general more functional or protective measures that represent an additional cost. Thus, a ministerial decision may be taken after the DUP, that takes into account project adjustments and also

updating of costs or other project characteristics, possibly made compulsory by new legal constraints (for instance, in France, important laws relative to water protection and noise were adopted in the early nineties, within the process duration of a number of the projects in the LOTI sample used here). This creates another decision stage for the project, which is then not exactly the same as forecasted in the initial decision, but also not a brand new project. Thus, besides the three types of explanation of cost escalation (technical, psychological and strategic misrepresentations), there exists reasons of project maturity, but also of evolution of the legal environment and of the preferences of the stakeholders.
This is why a third distribution is tested here, called “LOTI post DUP”, that takes into account some of the post DUP ministerial decisions.

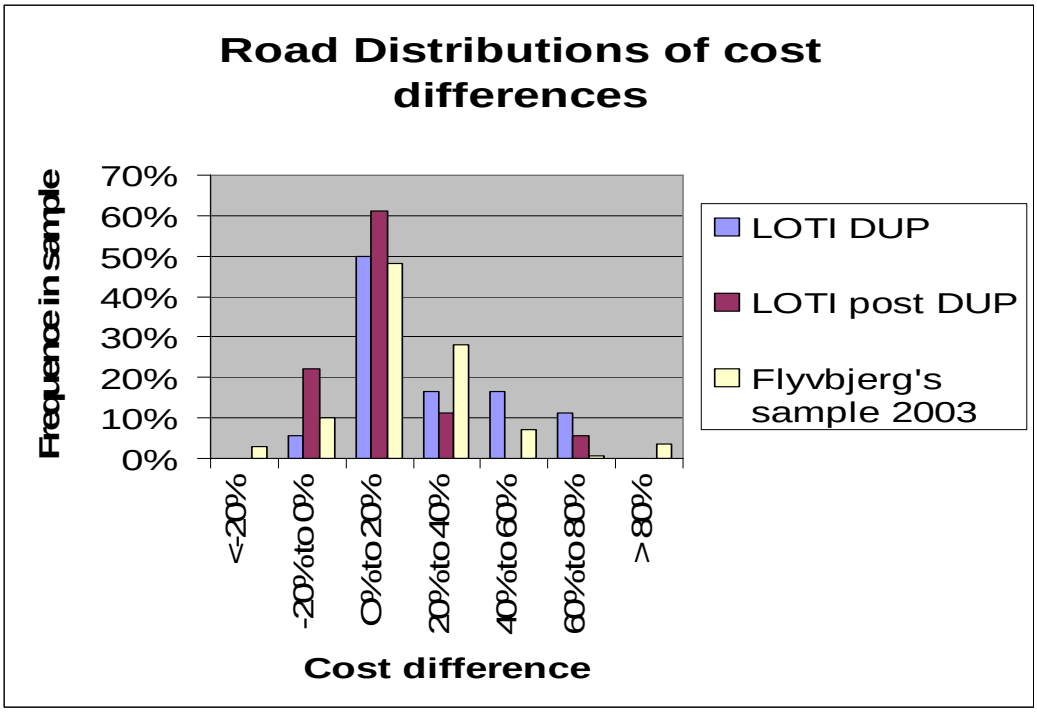

Figure 2

Figure 2 illustrates this for road projects: we see that the distribution becomes more concentrated around low cost differences. The average cost difference becomes 10% instead of 24% at the DUP stage. But the interpretation is difficult, because a new ministerial decision, besides possibly adjusting the objectives and contents of the project, also gives the opportunity, for example, to integrate cost differences that may have been known by the project leader beforehand. Thus, the “ideal” reference is not easy to find in practice.

Will it be easier in the future? Some positive arguments may go into this direction, essentially because the governance of projects has evolved a lot in the last decades. In France, for instance, public debates have to be organized before deciding on the opportunity of the project, and stakeholder discussion processes have been much developed: this should lead to better studied and evaluated projects, which are less likely to need adjustments since these adjustments would have been included into the project before the formal decision to build.

This gives us an interesting research question, which develops further the usual questions on the relationship between project duration and cost escalation: is there a positive relationship between the governance processes used for the projects and their final cost differences? Our sample is too small and too homogeneous since it concerns only one country, but international comparisons could perhaps fruitfully be made.

Are traffic levels over-estimated? Influence of trends and competition

Figure 3 gives the results of our LOTI sample for road and compares it to Flyvbjerg et al (2005).

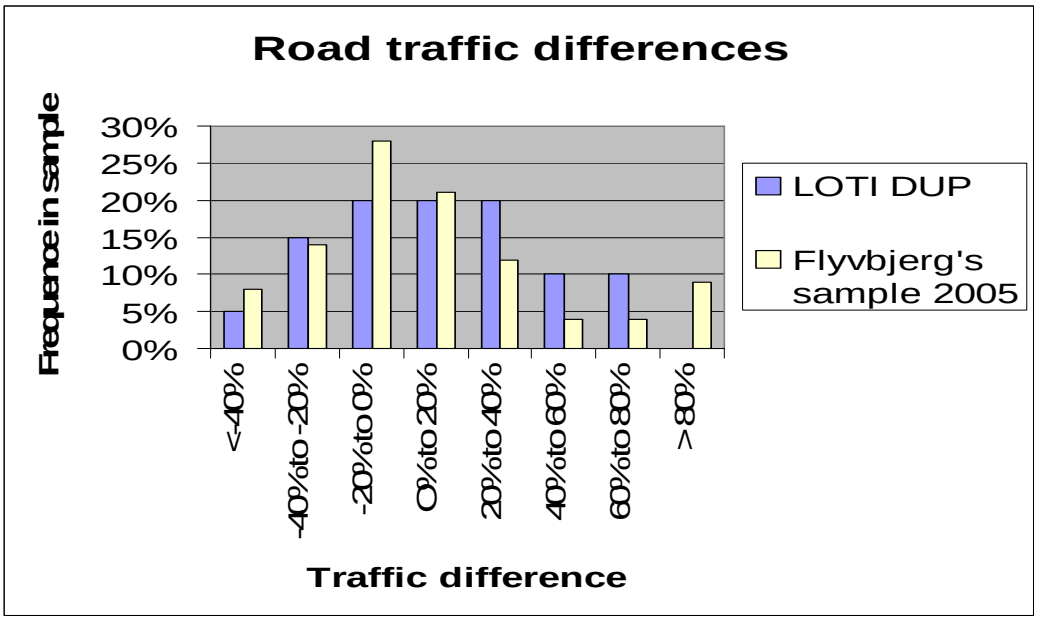

Figure 3

Here again the distribution is similar, there is no obvious over-estimation bias, and the average traffic difference is about 9%, a small under-estimation of traffic levels. The SETRA checks the influence of official references for traffic growth trends that have to be used for French national road project studies, and finds that, when compared to actual 2003 traffic levels, the official trends made from 1989 performed reasonably well while in the trends made in the seventies and eighties tend to under-estimate the 2003 traffic levels. For the older project studies, this may have contributed to some under-estimations.

Other explanations may be the omission of induced traffic estimation in some cases, as Welde and Odeck (2008) conclude for Norway. And there are many other reasons of traffic estimation errors, that may induce over or under estimations and do have their importance for some projects in the sample: mainly the representation of reference network and competition conditions within this network, which is probably of a greater absolute magnitude than the omission of induced traffic estimation, and the modelling tool imperfections. But

looking through these aspects supposes to have kept a sufficiently precise memory of the ex-ante study.

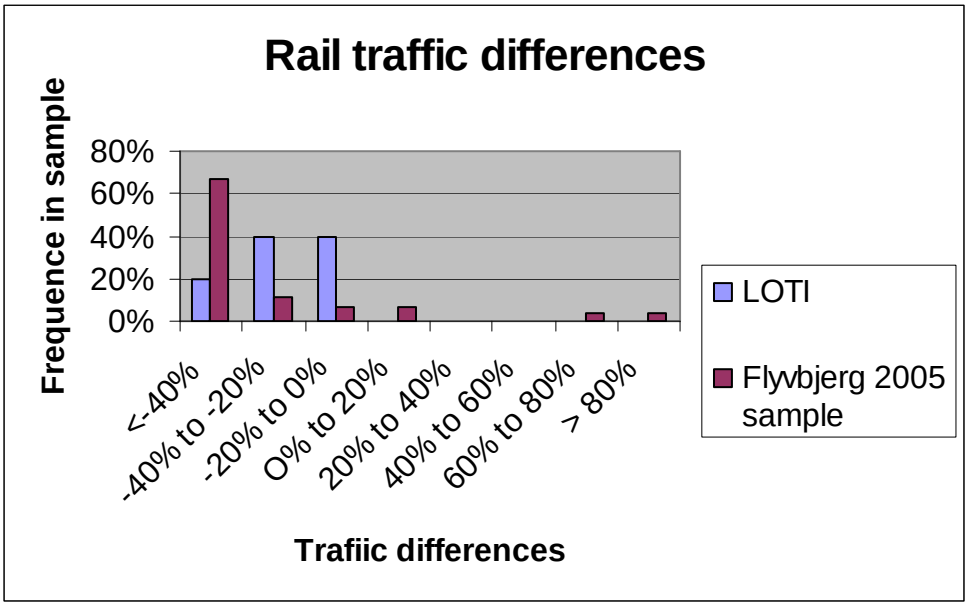

Figure 4

The size of our sample for rail is too small to make robust conclusions, but figure 4 shows the results for high speed lines (HSL): the over-estimation bias seems to exist too in France, but perhaps at a lower and more reasonable level (the average over-estimation is 24% while Flyvbjerg et al estimate it to be 45% for their international sample).

The CGPC/CGEDD analyses the traffic evolutions more in-depth and tests possible reasons for over-estimations. Indeed, the HSL traffic levels were impacted by the rail tariff's increases in the nineties, leading to rather big over-estimations at the time the new services were opened. The yield management introduced then, and the adjustment of tariffs made accordingly to competitive pressures - essentially from the air services -, progressively got more or less stabilised and contributed to much higher traffic growth trends than expected in initial studies.

Thus, the initial over-estimation tends to get smaller, but the lesson is that the effects of competition and pricing were not really taken into account at the time of the studies, whereas they proved to be of a great importance.

Influence of competition is often misregarded, even more on strategic issues such as pricing or service offer design, but also for market definition and proper representation of competitive routes or modal competition. This issue has grown in importance with the progressive opening of the transport markets in Europe. And the problem is that this opening of the markets has for a good part had the effect to reduce the rare and precious information on competition parameters such as the prices effectively charged – the yield management is part of it, but aggregation of data on diverse markets does also blur the picture a lot-.

The issue of data availability is crucial for rail especially, whereas, to make the problem more acute, rail seems to be the mode where the traffic forecasting errors are the greatest and is also the mode that may induce much infrastructure development, especially in countries that already have a developed motorway system and in which rail may represent the great majority of national or international new projects.

GOING A LITTLE FURTHER IN EX-POST ANALYSES

Traffic and costs are the most common parameters used for international ex-post analyses because they usually are the less difficult to obtain, and because they give an approximate but significant idea of the project's economic and financial interest.

When the ex-post studies available are more structured and offer a more precise image, it is always useful to make use of the other parameters they offer. Fortunately, in the French LOTI studies, such additional parameters are often available, and should always be for recent infrastructures. We will begin with the aggregate parameters that are supposed to synthesize the interest of the project, from the collective point of view, and for the project owner's point of view.

Socio-economic synthetic indicators

Since the LOTI studies have improved only progressively, it is not always easy to find homogeneous parameters to work with: internal rates of return are not always available, sometimes the Net Present Value only is given, and sometimes only the immediate rate of return (at the time the infrastructure is put in operation). The latest (ImRR) is the less difficult parameter to compute afterwards, or to extract from the socio-economic initial studies.

Given that costs were observed to be generally under-estimated, and traffics possibly over-estimated, whether regularly for rail projects or for about one half of the road projects, it is expected to find lower socio-economic ratios than those forecasted at the time. Indeed, figure 5 confirms this fact for the projects for which it has been possible to work on the ImRR, and allows giving an order of magnitude of this effect. Even with non-strongly biased traffic forecasts and with average cost overruns of about 24%, the road projects see their ImRR fall by about 30% in relative terms. The average ImRR of 15% drops down to 10% ex-post.

Still, this does not mean that the projects should not have been built, since the ex-post socio-economic internal rates of return are quite correct, around 15% for a good number of them. But, according to usual simplifying assumptions that allow concluding that projects should be implemented on the year their ImRR reaches the reference ratio, they should have been built a few years later.

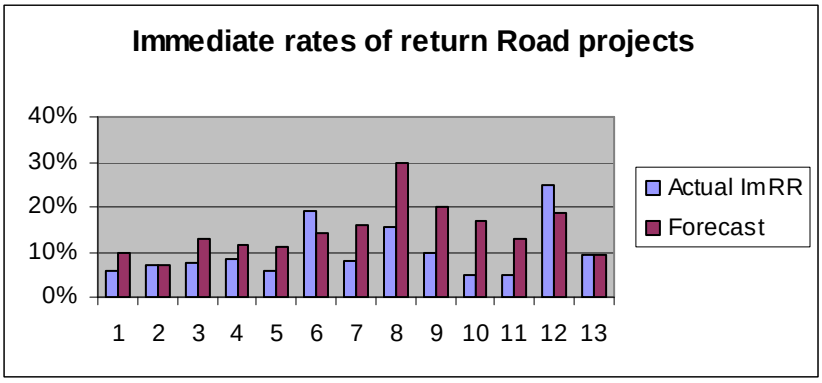

Figure 5

For rail projects, the picture is given for socio-economic rates of return, and it is rather similar. Indeed, the traffic over-estimation is accompanied by lower cost overruns than for road projects in our sample: the average expected rate of return of 18% drops down to 10% ex-post (only one project falls to pass the test of the by-then required rate of return, 8%[2]).

Thus, for the projects that could be analysed in the LOTI sample, (almost) all projects should have been implemented, but tended to have been implemented too early for about half of them, according to usual simplifying economic criteria.

Improvement of the level of service

What is the basic interest of new transport infrastructure? The improvement of the transport service is surely a key reason, but is it confirmed by ex-post studies?

For road projects, the usual criterion is the time spared by the users, as compared with the reference situation without the project. Both SETRA and CGPC/CGEDD have addressed this issue, and generally find that the outcome is more or less in line with the expectations, but that when traffic estimates went wrong, this unit advantage tends also to have been over-estimated. The typical case is an over-estimation of traffic growth on the corridor, accompanied or not by an over-estimation of the competitiveness of the project, and thus leading to less congestion in the reference situation.

This means that, the traffic over-estimation may well not transmit its effects linearly but in more “concave” ways, adding even more to the problem of project interest over-estimation.

For rail projects, we may try to check the actual frequency and travel time and compare them to the assumptions made in ex-ante studies. For the HSL observed, the match is rather correct, even if the nominal frequency has often been delayed for a few years, in line with lower traffic levels observed.

[2] The reference rate of return has been fixed a few years ago at the level of 4%, and the project in question does pass this test, fortunately. Also, road projects have all ImRR above 4%, which means that the implementation date was correct with this ratio.

Still, with the increased competition in the future, the frequency, and perhaps also the actual travel time, become strategic parameters that may evolve one way of the other, according to the situation: there is no integrated entity that may ensure both building and end-user level of service, unless an exclusive contract is given as in some forms of public private partnerships[3].

Safety improvement

Safety concerns are important for road infrastructure. Usually, road improvements and especially motorway construction do end up in much better safety levels for the user. This is confirmed by the LOTI studies, but this does not mean that the safety outcomes are in line with the expectations. In fact, the situation is similar to the over-estimation of overall traffic growth: whereas the ex-ante studies rely on data observed several years before the study was made, and thus may be 5 to 10 years, or more, before the project is implemented, the safety trends were meanwhile, in France quite good.

The safety effects were, as a whole but also regularly for the great majority of the projects, twice the observed effects: the new projects performed well, simply, the alternative routes were not as much unsafe as expected.

Nevertheless, this may not translate fully into the final socio-economic parameters, since the unit values for safety did increase also, in line with the growth of public concern on the issue of road safety.

Table 2 gives the evolution of some official values that have to be applied to national projects in France.

Table 2

		Rules 1980	Rules 1986	Rules 1994	Rules 2004
	Unit	french francs of 1985 for base year 1980	french francs of 1985 for base year 1985	french francs of 1985 for base year 1994	french francs of 1985 for base year 2000
Value of time	per hour, personal car	51	76	58	165
	per hour, HGV	79	132	153	183
Accidents	per fatality	1,58	1,60	2,91	4,80

After SETRA (2008)

[3] In this last case, however, economic and financial concerns are still the most important for the private partner, and most probably, clauses in the contract will allow for some flexibility in this regard, in practice.

Land consumption

Transport infrastructure need land that could be use for other concerns, transport concerns but with another mode, and concerns outside transport such as agriculture, constructions, economic development, recreational needs, …. But the land needs are rarely taken into account as such, they usually appear only through the costs of buying the land, within the investment costs.

LOTI studies give a few analyses on this topic[4]. Their scarceness does not allow making robust conclusions but it seems that there is also an underestimation of land surface needs. For example, in one case, the actual land surface bought was twice the expectation, due to modifications in the project's programme: reservations were made to prepare right away to a future enlargement of the motorway, addition rest areas to be built, etc...

Another question is: the impact of a transport project on land use goes much further than its direct consumption. Besides the difficult question of induced urban or economic development in the mid and long term, such further effects may be found in the reorganisation of agricultural land that takes place whenever an infrastructure is built. This has most of the time been the major observable impact on land change in the vicinity of the infrastructure. Some landscapes have dramatically changed, together with their ecological role, and the conditions for local biodiversity. This leads us to discuss rapidly some environmental concerns.

Environmental concerns

Ecological concerns and land concerns are closely linked, and ecological concerns are present in LOTI studies, and will be more and more. Even in the very first CGPC analysis of a LOTI project, back in 1999, the concerns about the disappearance of a notable area of a specific ecologic environment (the "ripisylve", the woods along the rivers) were mentioned and taken as a strongly negative aspect of the project considered. Now that biodiversity has become a major theme – remember that 2010 is the international year of biodiversity -, this dimension will take more importance, and not only for emblematic species that have long ago focus the attention.

Water pollution is another important concern. The LOTI studies do tell something about these effects; they check that potential problems have been correctly treated, with the due protection measures for accidental or regular pollution that were required for the project. Sometimes, some data collection on water quality is available. For the moment, this preoccupation focuses mainly on water needs for human activity, but progressively it should

[4] For example, the LOTI study on A77 estimates that 75% of the 1300 hectares bought were taken on agricultural land. More precise former land use analyses are often given (forest, water areas,…).

evolve towards more environmental concerns, with, for instance, more special attention given to sensitive natural areas (e.g. Natura 2000) in the vicinity of the infrastructure.
Air pollution is rarely taken into account other than qualitatively, and for urbanised areas.

And what about "new" concerns such as green house gases?

The growing share of transport activities in GHG emissions should lead to giving more attention to the effects of transport projects in this regard. Unfortunately, until now, this has not been the case. The only studied parameter that can be of some use as a proxy is the traffic consequences. But the precise conditions (speed, regularity,…) that may help estimate more accurately the emissions are not known, thus only approximate reconstitutions could be made using average ratios.

Still, one element is important in this regard, that reminds us of the observations made on the safety concerns: it is necessary to take into account the evolution of unit emissions, especially for transport infrastructures, that have long life duration. Some ex-ante studies made in the lasts decade for important transport infrastructures gave estimates that were merely based on average emissions observed just a few years earlier. Incorporating the evolution trends that result from international agreements and norms, the result was that the CO2 tons estimated by the studies were more than 2 times higher than the more correct estimates. At times when GHG was not a concern, and with low values of CO2 taken into account (whenever they were) in the socio-economic evaluations, this was not important. But now, with the high values of CO2 that have already been considered in countries like Sweden for several years, or with new values considered in many countries, this has become a concern.

We have given here a very rapid overview of what can be found in the LOTI studies. SETRA (2008) gets into more detailed analyses, especially on socio-economic effects, than what is possible in the limits of the present paper.

But, before coming to the conclusions, it may be interesting to look at some other new concerns that are developing as regards the impacts of transport projects, since any ex-ante and ex-post study should try to treat them.

The growing questions on acceptability of infrastructure, for instance, together with recent works such as the Stiglitz-Sen-Fitoussi report (2009), lead to giving more attention to the distributive effects of transport projects. The usual cost-benefit analysis uses the implicit assumption that all effects on stakeholders finally end up in being evenly re-distributed, this is what allow us to simply add them together. But real life is not like this, and the increasing importance of stakeholder association and consensus puts new challenges for project evaluation. The LOTI and other ex-post studies do not give general elements on this issue, other than some thematic analyses such as the effects on agriculture (see SETRA (2008) page 52).

In relation to the previous question, it becomes more and more important to give attention to the role and consistency of the new infrastructure at the territorial scales it interacts with. This is linked to several factors: the growing concerns about governance and acceptability, the sustainable development philosophy, and also ... the result of ex-post studies. Indeed, as regards the relation between new transport infrastructure and local economic development, ex-post studies have shown that no automatic effect had to be expected, that it was a question of high or low, positive or negative synergy with the territories' projects and trends.

Therefore, the exploration of this dimension based on territorial diagnosis, a more precise determination of the functions of the infrastructure in relation to the territories, and the ex-post observation of the outcomes should develop more in the future. The LOTI analyses try to treat these aspects, and begin to constitute some elements of knowledge in this regard. Still, the time scale of such ex-post studies is too limited to capture long term effects such as changes in location of activities or populations: local observatories (that exist here and there in France, too, for example the A75 observatory) may be a complementary tool to explore these dimensions. Thus, the functions of the infrastructure and the initial logics and effective interaction or consistency that comes out in the end have become objects of analyse for the ex-post infrastructure studies.

Some LOTI studies have tried to gather knowledge on the opinion of stakeholders on the infrastructure, and sometimes to compare it with the ex-ante opinion. Opinion polls are then performed for different types of users or stakeholders. For the LOTI study on A49, for instance, their opinions were asked, not only on their perception of the performance and interest of the motorway, but also on their wishes for improvement.

We will end this series of "new" concerns review by the questions related to risk and uncertainty. This is not a new concern, especially for ex-post studies since one of their objectives is to gather knowledge about the accuracy (or, conversely, the dispersion) of the ex-ante estimates when compared to actual outcomes. Indeed, we gather thus some information about the distribution of risks of differences between the constructed beliefs on the infrastructure's effects and their real effects. It is then possible to use risk management tools. They may be simple ones such as introducing a systematic correction whenever a regular bias has been put to light. They may also be preventive tools related to the development of methodology and data for more in-depth and case by case ex-ante studies Intermediary tools are possible, such as the reference class forecasting methods developed after Kahneman and Tversky.

Also, the perception and actions are continuously evolving in our societies: what was formerly considered as fate is now often considered as inadmissible risk that should be addressed by public decision and the society. Road safety or tunnel safety are good examples in this regard, but noise or environmental risks may be related to this line of evolution. If, symmetrically, we take the infrastructure's point of view, among the risks it faces in its long life, the risk of evolution of collective preferences is also present.

But how may ex-post studies help us as regards risk and uncertainty? Surely enough, for frequent risks that may translate into statistics, they are useful as we have seen. But for more major and less frequent risks, such as the possibility that the main user of a freight infrastructure suddenly diminishes or ends its activities (ex: refineries or steel factories that would need port or rail infrastructure), what use may they be? They can only measure the final outcome, not the other outcomes that were possible at the time of decision. This inherent limit is nevertheless compensated by the possibility of in-depth analysis of the evolutions that lead to the actual outcome, especially at key periods where evolutions could have been radically different. If we take the same simple example as above, knowing that the infrastructure owner had or not a contract with the factory, including risk management measures such as imposing penalties if traffic levels where not sufficient, would perhaps be important. Analysis of the potential actions of the stakeholders helps to assess, both ex-ante and ex-post, the project robustness as regards diverse risks.

The ideal situation here would be to have an ex-ante study analyse scenarios and conditions of realisation of these scenarios, and compare them not only purely on the final result expected, but also on the realisation of these conditions and possible bifurcations between scenarios.

Adopting this point of view, ex-post studies could bring us a lot, especially in a period of growing uncertainty and multiple evolutions.

CONCLUSION

We have illustrated here only part of the richness that may be found in ex-post studies such as the LOTI studies in France. Fortunately, analyses of these studies are beginning to appear. Their quality has progressively improved and they provide much diverse information than what usually appears in the literature.

Besides testing the actual dispersion of costs and traffics as compared with expectations, and comparing the results to international observations too, they allow testing the methodology and parameter values used in the ex-ante studies, when the latest are documented enough. This means that a good part of an ex-post study depends on the ext-ante study' s quality as regards clearness and completeness on assumptions made and key data and main methodologies used. This only makes it possible to properly make an ex-post attempt to distinguish what part of the difference observed is due to the difference between actual parameter values and their ex-ante estimates, and what is due to the method or modelling itself. Thus, a detailed and well-preserved memory of ex-ante studies is highly important for making detailed ex-post diagnosis and interpretation, beyond pure factual observation of differences. Also, the question of the interference between progressive project adjustment and ex-post difference measurement has been partially treated in the text, thus giving way to research tracks.

But the richness of in-depth ex-post studies such as LOTI lies also in the information on more direct "overall performance" parameters such as rates of return, and on the numerous other thematic aspects of a project's utility and effects. Simple parameters might be collected by international ex-post studies in the future, that could capture part of these aspects, such a as land consumption disaggregated by type of former use or, progressively, effect on CO2 emissions. And more qualitative but in-depth analyses could be made when ex-post studies in different national studies would include a focus on the same themes, say, agricultural effects or distributional effects.

What is sure anyway is that ex-post studies could and should have a key role for improving the credibility of ex-ante assessments, both technically and from the public and stakeholders' point of view. One way to go into this direction could be to coordinate ex-post studies on some international routes or to develop international thematic analyses. Perhaps the conjunction of international researchers and public officials at WCTR could offer an opportunity to bring more easily this kind of ideas to life.

REFERENCES

Boardman A.E., W. L. Mallery and A.R. Wining (1994). Learning from ex ante/ex post cost-benefit comparisons: the coquihalla highway example. Socio Econ. Plan. Sci., 28/2, 69-84.

Conseil Général de l'Environnement et du Développement Durable (2008). Avis sur les bilans LOTI des LGV Rhône-Alpes et Méditerranée.

Conseil Général de l'Environnement et du Développement Durable (2008-2010). Avis sur les bilans LOTI des autoroutes A19, A5, A29, A51, A26.

Conseil Général des Ponts et Chaussées (2001). Bilan LOTI de la LGV Atlantique.

Conseil Général des Ponts et Chaussées (2006). Avis sur les bilans LOTI des LGV Nord Europe et interconnexions Ile de France.

Conseil Général des Ponts et Chaussées (1999-2008). Avis sur les bilans LOTI des autoroutes A43, A49, A57, A14, A20, A28, A837, A54, A7, A19, A39, de la RN24, du tunnel du Puymorens.

Direction Régionale de l'Equipement Auvergne, Bilan LOTI A75 nord (2008).

Flyvbjerg, B., M.K.S. Holm and S.L. Buhl (2003). How common and how large are cost overruns in transport infrastructure projects ?. Tran. Rev., 23/1, 71-88.

Flyvbjerg, B., M.K.S. Holm and S.L. Buhl (2005). How (in)accurate are demand forecasts in public works projects? The case of transportation, J. Am. Plann. Assoc., 71/2, 131-146.

Mackinder, I. H. and S.E. Evans (1981). The Predictive Accuracy of British Transportation Studies in Urban Areas. Supplementary Report No. 699 (Crowthorne: Transportation and Road Research Laboratory).

Odeck, J. (2004). Cost overruns in road construction – what are their sizes and determinants?. Transp. Policy, 11/1, 43-53.

Pohl G. and D. Mihaljek (1992). Project evaluation and uncertainty in practice: a statistical analysis of rate-of-return divergences of 1 015 World bank projects. The World Bank.

Preston, J. and G. Wall (2008). The ex-ante and ex-post economic and social impacts f the introduction of high-speed trains in South East England. Planning Practice and Research, 23/3, 403-422.

SETRA (2008). Analyse transversale de bilans LOTI de projets routiers. SETRA, Bagneux.

Stiglitz J.E., A. Sen and J.P. Fitoussi (2009). Report by the Commission on the measurement of economic performance and social progress. Paris.

Welde M. and J.Odeck (2009). Do planners get it right? The accuracy of travel demand forecasting in Norway. ITREC 2009 conference, Minneapolis.