TRANSPORT INVESTMENTS : FIVE POLICY TEMPTATIONS[1]

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There is no doubt that transportation requires infrastructure such as roads, rail lines, airports, harbors, etc. For a given demand in transport services, given technology and relative prices, there is an optimal amount of transport infrastructure to be supplied. This optimality refers to the quantity, type and location of transport infrastructure. It is not easy to achieve. There is a serious danger of undersupply, giving rise to bottlenecks, delays, congestion, increased operating costs. But there is an equally serious danger of oversupply, giving rise to a waste of scarce resources, overpricing, or unsustainable debts. In a given country, there can be at the same time an oversupply and an undersupply of transport infrastructure, that is too much in certain places or modes and not enough in other places or modes.

The supply of transport infrastructure results from transport investments. What matters is the supply; investments are what drive the supply. This stock v. flow distinction is important. It is often forgotten. We are all familiar with the many studies that compare the rate of growth of transport services (in ton*km or passenger*km, for instance) with the rate of growth of transport investments, to conclude that not enough transport investments are being made. This comparison, and this inference, are misleading, not to say meaningless. What should be compared with transport demand growth is (if anything) transport infrastructure growth. Transport infrastructure growth is determined by investment growth, but also by the size of investments, the life span of transport infrastructure, and maintenance expenditures. A stock of infrastructure can perfectly well grow with a stagnant or even declining investment infrastructure flow, as long as this flow is greater than infrastructure depreciation.

Nevertheless, policy discussions and decisions center on transport investments. Three forces, or groups or

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lobbies, influence the debates: politicians, builders, and — increasingly so — environmentalists. Politicians and builders are generally "for" transport investments. The reasons are obvious for builders, a category that include engineers and public works companies. Politicians also benefit from transport investments, particularly transport investment inaugurations, that make them look as achievers and forward-looking, particularly when their constituents do not have to foot the bill. Environmentalists are "against" transport investments, because they do not care much for mobility (some are definitely against it), and care a great deal for environmental damages associated with transportation, particularly road transportation, as they often favor non-road investments. Overall, the resultant of these forces seems to be pro-investments. There is a socio-political bias in favor of transport investments.

This bias is currently reinforced by the present economic recession. For the first time in decades, in most countries the macro-economic situation is or can be seen as a demand shortage, calling for Keynesian remedies in the form of debt-financed public investments. Whether these investments are really useful becomes a secondary consideration: they do contribute to stimulate overall demand and to fight the recession, which is — for good reasons — the main objective of present policies.

We are therefore entering an era in which massive transport investments are likely to be considered and in many cases undertaken. There is a real danger that some, perhaps many, of these investments will not be fully economically justified.

As mentioned above, generalizations are meaningless and should be avoided. The standard question: are transport investments necessary ? is not a good one. The truth is that some are necessary, others are not. It all depends upon the location, the mode, the present level of infrastructure endowment, the cost, the demand. Yet, some common features of investments practices can be identified, and shown to be dangerous. It is fair to say that in most countries, policy-makers tend to prefer:

- big investments to small investments;
- transborder links to domestic links;
- rail to roads;
- investment expenditures to operation expenditures;

- political decision-making to economic analysis.

This paper will try to show that these tendencies are generally wrong and dangerous. They can be seen as five temptations shat should be resisted.

The temptation to prefer the big to the small

For a given amount of money, decision-makers usually prefer to undertake one big project rather than many small projects.

This is true of politicians. They maximize the unit (ie per euro) political benefit they derive from spending. The visibility of a project is an exponential function of its size. A small project goes unnoticed, particularly by the media. A mega project attracts a lot of attention, particularly in the media. Publicity hungry politicians have more to gain by supporting and financing large projects rather than small projects. Mega projects appear as a justification of their "action", to their own eyes, and to the eyes of their electorate.

This is also true of technicians. Bureaucrats find small projects boring and unrewarding. But they like designing and conducting large projects. It boosts their importance and ego and carriers. Being known as the man (rarely the woman) who "did" this big bridge, or this long rail tunnel, is professionally important and is a much appreciated element in the CV of a transport engineer.

This is equally true of large public works companies. They are about the only ones who have the required expertise to carry out mega-projects, and they are eager to build (if this is the right word) and make money upon this comparative advantage. In addition, they entertain the right contacts with politicians and bureaucrats.

There is with the size of projects a phenomenon akin to the preference for the best, as explained by the "theory of super stars". The willingness to pay to enjoy the top pop singers, or opera singers, or movie stars, increases more rapidly that the objective quality of these stars. If number 1 is 20% "better" than number 5, people will be ready to pay 50% more to go and listen to number 1 than to number 5. This has been explained by imperfections in information. Both number 1 and 5 are actually very good, and most people are unable, for lack of time and knowledge and judgment, to know who is the best. But since they want to go and listen to the best, they are ready to

pay a premium to go to the one who is presented as the best by supposedly knowledgeable people.

Yet, there are reasons to believe that small transportation projects are often socially more useful than large ones (per euro spent, obviously). The influential Eddington Transport Study (the policy paper prepared for the UK Government by a commission chaired by Lord Eddington) presents a graph (Eddington 2006, vol.3, p. 132) that charts the benefit cost ratios of more than 100 transport "schemes" (as they are called) as a function of their cost, i.e. their size. The benefit cost ratio of the greater schemes are definitely lower than those of the smaller schemes. In other words, it seems that there are diseconomies of scale at work in transport projects.

Why ? The Eddington Study speculates that "because lower-cost schemes tend to be smaller scale, they are more likely to be targeted on particular problems and pinch points that provide significant benefits for many travelers" (idem). Made to measure clothes give more pleasure than ready made clothes, and it could be that, in transport projects, they do not cost more. Two additional reasons can be suggested.

Small projects are more likely to benefit from network economies. They are usually improvements or additions to a wider network. They make it possible for their users to utilize the entire network, at a low marginal cost. This is obvious in the case of the Paris metro. A number of the metro lines have been "extended" by one or two kilometers beyond the limits of the Paris municipality, in densely suburban areas, making it possible for many people to have an easy access to a very efficient subway network: moderate cost, very large benefits.

Many small projects are maintenance projects. It is well established that the rate of return of maintenance projects is much higher than the rate of return of new projects. The World Bank established that firmly in the 1980ies on the case of roads in developing countries, and subsequently stopped financing new roads in countries that did not maintain their existing networks properly.

Extensions, improvements or maintenance projects may not be as glamorous and as politically attractive as grand schemes, but they are often more cost-effective. The temptation to prefer the big to the small is dangerous and should be resisted

The temptation to prefer transborder to domestic projects

A number of people and institutions are fascinated by transborder projects. This is obviously the case of multi-national institutions such as the Economic Union and its administrative branch, the European Commission. For subsidiarity reasons, they have a limited legitimacy to intervene in the domestic affairs of member states (this does not quite prevent them from doing so, however, as can be seen in the EC policy papers on urban transport for instance). To justify an intervention in the field of transportation, these institutions must find an "international dimension" in a project or a policy. Such dimensions do exist, and the role of the EU in emission norms or in competition policies, for instance, has been fully justified and beneficial. In transborder or transfrontier transportation, the "international dimension" is obvious, providing a solid theoretical foundation for intervention in this area. The EU has developed a massive Trans European Network (TEN) that consists of 30 mega-projects for an estimated cost of 380 billion euros. This cost is clearly underestimated, and a figure of 600 billion euros would be more realistic. The EU has not the money to fund such a program, and most of it is to be funded directly by member countries.

These pharaonic projects find support in member countries. The intellectual justification is that international trade grows faster than domestic trade, which grows faster than GDP, and that this growth of international trade is one important factor of GDP growth in each country. Without great improvements in transfrontier infrastructure, there will soon be transport bottlenecks, that will slow down international trade, and economic growth. There is some truth, and much exaggeration, in such statements.

It is true that international trade has grown faster than GDP in the past two decades. But this growth is usually measured in money terms. It is not so impressive in tons or in cubic meters of goods transported, because the unit value of a ton (or a cubic meter) has also increased greatly. Then, it is not sure that the coming decades will be like the past decades. The growth of international trade was accelerated by the impressive lowering of trade barriers world wide that occurred in the 1980ies and 1990ies; but these barriers are now so low that they cannot be much lowered, and the lowering effect will not be repeated. In addition, a large share of this increase in international trade has taken the form of

increased sea traffic with China and other Asian nations, not inland traffic within Europe.

Numbers that are too "global" can be misleading to appraise a particular project, even if it is a mega-project. Consider for instance the traffic through the Alps between France and Italy, the future growth of which is supposed to justify the Lyon-Torino tunnel, one of the most costly TEN project. Far from increasing in the past decade, this traffic has actually stagnated or even decreased.

France-Italy Goods Traffic Through the Alps, 1996-2007

	1996	2007
Trucks[a] (M)	1.49	1.48
Train[b] (M wagons)	0.35	0.24

Source : URF 2008, p. II, 38-39
Notes : [a]Frejus and Mont-Blanc tunnels ; [b]Mont Cenis tunnel

The emphasis on transborder traffic and investment ignores the well established "border effect". Goods exchanges between a city or region A and a city or region B, as predicted by the standard gravity effect, are divided by a factor λ when there is a frontier to be crossed between A and B. This factor λ, a measure of this "border effect" is high. Between the US and Canada (two countries well integrated economically, speaking the same language, with many companies operating in both countries), λ was estimated to be above 10 (Mc Callum 1995; Anderson 2001; Helliwell 2003. For Europe, Head and Meyer (2001) showed values of λ declining from 25 in 1978-80 to 15 in 1993-95. In other words, assuming that the distance between Lyon and Torino is about equal to the distance between Lyon and Marseilles, and assuming that the economic weight of Torino is about equal to that of Marseilles, Lyon-Torino traffic would be about 1/15 of the Lyon-Marseilles traffic.

A drive from Paris to Brussels illustrates it very clearly. As one leaves Paris, traffic density is very high, perhaps with episodes of congestion. Then traffic densities decline. They peak again as one approaches Lille, to diminish shortly after. They are minimal at the French-Belgian border, but increase as one nears Charleroi, and even more so as one reaches Brussels, with again the possibility of congestion episodes.

In short, borders tend to be the places where infrastructure bottlenecks do not exist. There must be exceptions, but they are few. What is true, however, is that there are problems in the transborder operation of

trains (known as transoperability problems in EU jargon). These problems are serious, but they are not infrastructure problems, and do not call for massive investments. Infrastructure bottlenecks are much more likely to be found within countries, particularly in urban areas. The temptation to focus attention, projects, and resources on transborder investments rather on domestic investments is therefore likely to lead to serious misallocation of resources, and should be resisted.

The temptation to prefer rail to road

In most European countries, and in the European institutions (Union, Commission and Parliament), there is a strong anti-road feeling that produces a pro-rail bias in infrastructure investments projects. In short, although road transport accounts for about 90% of inland transport (in value terms), rail transport receives about 90% of infrastructure transport investments. Out of the 30 Trans European Network projects, only two or three are highways. The mismatch between the transport demand (more roads) and the transport supply (more rail lines) is blatant. In central Europe, most countries have had, under communism, more than their share of rail infrastructure. They ask European Commission civil servants to help them build highways. The answer they get is : no, what you need are rail investments, and we have money for it, we won't let you make the mistakes we have made. It would be fun if it were not sad.

Rail transportation may be fashionable and politically correct, but it is uneconomic in most cases.

To begin with, it is costly in terms of public finance. I am familiar with the data for France, but I understand things are not very different in other countries. Whereas road transportation is heavily taxed, rail transport is heavily subsidized. In France, *specific* road usage taxes (taxes in excess of the ordinary taxes that are levied on other goods and services) amount to 36 billion euros, when public expenditures on road amount to 16 billion euros : the net gain for public budget is therefore about 20 billion euros. Rail transportation, by contrast, covers about half its costs, and is subsidized to the tune of about 10 billion euros (wages are nearly equal to fees paid by users, and all other costs are therefore borne by the taxpayers, or by an increase in the debt of the rail sector). More rail transportation therefore automatically implies tax or debt increases.

Then, these taxes and subsidies are highly regressive. Road usage, and therefore road taxes, increase more slowly than income. As a percentage of household income, road taxes represent 3.3% of the income of the poorest quintile, and only 1.6% of the income of the top quintile. This is the definition of a regressive tax. The reverse is true of rail expenditures and therefore of rail subsidies. As a percentage of income they increase with income (with the exception of the first quintile). This is the definition of a regressive subsidy.

The distribution of high speed trains users by socio-professional groups is highly skewed *in favor* of high income groups. Surveys show that "managers and professionals" [dirigeants et cadres supérieurs] representing 6% of the population account for 46% of high speed trains users on the Paris-Lille line and 39% on the Lyon-Marseilles line; conversely workers and employees" [employés et ouvriers], representing 26% of the population, account for 12% and 9% of users on these same lines (Conseil Général des Ponts et Chaussées 2008, p. 105). Trains, particularly high speed trains, offer a classic case of taxes levied on the poor to subsidize the rich.

Third, the emphasis on rail is likely to result in a decrease of mobility. To a large extent, the idea of a modal shift induced by increased rail supply and decreased road supply is but an illusion. Rail used to be a general transportation mode. This function is now played by road. Rail has become a niche mode, more efficient than road for long distance passenger trips, for mass transit in urban area, and for certain types of freight (heavy goods, transported in large quantities, over long distances, at moderate speeds). But these compartments of transportation account for a relatively small share of total transportation. The bulk of freight transportation, for instance, is over short distances (for which rail transportation is unthinkable), or has to be delivered very quickly (something rail is unable to do : the average door-to-door speed of rail transportation in France is 15 km/hour). The bulk of urban transportation now consists of periphery to periphery trips, for which the multiplicity of itineraries and low densities prevent the development of public transportation. The commonly accepted view that a road trip that will be suppressed will be replaced by a rail trip is in most cases a myth. Consider a family that is used to vacation in a seaside camping it reaches by car. If it is prevented to use its car by anti-car policies, do you think it will take an expensive train with its tents and tables and cookery, and walk from the

train station to the camping ? No, it will refrain from taking its vacation. Less road transportation usually means less transportation in general.

This is clearly illustrated by the case of French cities. The findings of important transport surveys conducted in two of the most important French agglomerations (about 1,2 million inhabitants) conducted at different periods show the evolution over the past decade.

Table 2 – Changes in Motorized Mobility in Lyon (1995-2006) and Lille (1998-2006)

	Lyons	Lille
Public transport mobility	+9%	+39%
Automobile mobility	-15%	-13%
Total motorised mobility	-11%	-9%

Sources : surveys, summarised in : www.certu.fr
Notes : The data refers to the agglomerations, not the city centers. Mobility is defined as the number of trips per person per day on a representative weekday.

As a result of politically correct – and costly – anti-car and pro-public transport policies, car mobility markedly declined and public transport mobility increased. But this led to a significant (about 10% in a 8-10 years period) decline in total mobility. Most of the car trips eliminated have not been been substituted by public transport trips: they vanished into thin air. Such a decline in mobility implies a decrease in the economic efficiency of these cities.

It is often argued that "externalities", particularly CO2 externalities, justify these anti-car policies and the pro-rail infrastructure investment bias. It is true that there are more CO2 emissions, local pollutants, and casualties associated with car transportation than with rail transportation. But this is not enough to justify rail investments. First, most of these externalities are already internalized by means of specific taxes. The CO2 rejected by a liter of gasoline (2,35 kg) can be valued (at the generous figure of 30 €/ton of CO2) at 7 cents of one euro. The same liter of gasoline pays 72 cents in specific taxes : this is ten times more[3]. As a matter of fact, for every liter of gasoline "saved", treasuries lose 72 cents with which they could purchase a CO2 reduction of 23 kg. Second, the idea that the only or the best way of reducing local pollution or car accidents casualties is to reduce car usage is plain wrong. Both local pollution and

[3] This point is true in Europe where fuel taxes are high ; it might not be true in the US where fuel taxes are lower.

accidents have been recognized as serious problems, and addressed as such. Not by reducing road usage, but by reducing externalities per unit of road usage. Local pollutants emissions *per km*, and car accidents *per km*, have been curtailed, by means of emission norms, and by a combination of better cars, better roads and better driving habits. The magnitude of this curtailment is impressive: by and large, emissions and accidents have been halved in a decade. There are very few social issues that have been treated with such a success.

There is no doubt that every transport mode should pay the full costs it imposes upon society. This includes external costs in the case of road transport. But road transport does pay its externalities (which are declining), whereas rail transport does not even pay its internal costs.

The temptation to systematically prefer rail investments to road investments is great, because it is much more politically correct. It should nevertheless be resisted.

The temptation to prefer investment to operation

Another common temptation is to treat all transport problems by means of infrastructure investments, i.e. by increasing the existing stock of infrastructure. There are cases when this is justified or even necessary. But they are not the most common cases.

First, transportation is a service that, like any other good or service, is provided by a mix of labor and capital, and organization. Increasing just one input, capital, is not, or at least not always, the most cost-effective way of increasing output. In many cases, additional or more qualified labor, or a change in organization, will be enough to increase the supply of transportation.

Second, demand management is often an alternative to infrastructure expansion. The demand for transportation tends to vary greatly over space and even more so over time. It is characterized by peaks. Infrastructure cannot always be calibrated to satisfy peak demand. In many cases, it is possible, through prices varying over time, to flatten the demand curve over time. This is the essence of congestion pricing, but also of yield management. When you have a fixed capacity and a demand curve that exceeds this capacity from time to time, you have the option of increasing the capacity or of modifying the demand curve.

The second option (to make the best use of existing capacity) has a cost, but a cost which is usually much smaller than the cost of the first option (increasing capacity).

In addition, the nature of transport demand is changing, from the mere moving of goods and people towards the provision of complex services including packaging, tracking, delivery, insurance, etc. know as logistics. Logistics used to be a by-product of transportation; it is now transportation that becomes a by-product of logistics. And logistics does not require much in terms of infrastructure. It requires computerized networks and organizational sophistication rather than enlarged roads or additional rail lines, software rather than hardware.

The temptation to think infrastructure when faced with a transport issue should therefore be resisted.

The temptation to prefer political decision-making to economic analysis

A fifth temptation is to abandon economic analysis in favor of political judgment. Transport investments have historically been the sector most influenced by economic analysis. One could go as far as saying that project analysis was first invented to solve transport investment problems. Jules Dupuis (1848), a French engineer of the powerful body of Roads and Bridges Engineers, introduced the founding concept of consumer's surplus to appraise the utility of a non-tolled bridge. In France, as in many other developed countries, cost-benefit analysis has been widely used to define and decide transport investment programs. There is even a 1982 Law that makes it compulsory for any large infrastructure investment. Yet, it seems that it is less and less effectively utilized.

First, these analysis are not conducted by independent analysts, but by interested sponsors. It is Réseau Ferré de France, the entity that owns the rail network, that appraises rail investments, with the help of the consulting firms they chose and pay. It is Voies Navigables de France (VNF), the entity in charge of canals, that evaluates canal projects. For such entities directly interested in developing the project, the temptation to overestimate the gains and to underestimate the costs is great, and it would be difficult to say it is always resisted. In principle, such studies are overseen by the ministry of Transport. But the complexity of these large projects is so great, the information requirements so immense, the uncertainties so large, that it is not

realistic to expect a handful of ministerial technicians to be able to do a very effective supervision job. This author sat in a committee that was examining the massive evaluation made of an important canal project, prepared by sophisticated teams of consultants. He felt like being a judge at a trial in which only one side of the story was presented (with talent), in the absence of a defense lawyer. (He concluded that large cost-benefit analysis should be conducted in an adversarial fashion, with consulting firms paid to defend the project, as is the case now, and other consulting firms paid to criticize it; with independent judges listening to the discussion and making up their mind. But this is another story).

Second, the findings of socio-economic evaluations are usually ignored by decision-makers. France offers an impressive example of that. In 2003, a new government came to office. It asked for a review of all the transport projects (there were about 30 of them) that were in the pipeline. A high level group was created and did an excellent job (as good as could be done), identifying the projects that were economically desirable and those that were not. A year later, the government organized an interministerial meeting and decided to undertake … all the projects considered (but one).

Third, the imperfect practice of cost-benefit analysis seems largely limited to national governments. At least in France, sub-national governments, which are responsible for a growing share of infrastructure investment, do not appear to undertake serious evaluations. Decentralization is an enemy of cost-benefit analysis. Decisions are based on the wisdom of regional politicians only. The same seems to be true of European Union and European Commission practices. The 30 mega-projects of the Trans European Network for instance have been identified and selected in the absence of cost-benefit analyses.

Nobody suggests that transport investment decisions should be taken only and automatically on the basis of cold cost-benefit analysis. The imperfections and shortcomings of cost-benefit analysis are well-known and very serious. Transport policies have many different objectives (at least 7 or 8: maximize mobility, protect the environment, minimize costs, contribute to equity, favor regional policies, ensure safety, facilitate industrial policies) that are often in conflict with each other. For instance, policy or investment A might favor mobility whereas policy B contributes to income redistribution. An economist has no legitimacy and

expertise on such a choice: at best, s/he can specify and quantify the impacts of A on mobility and of B on redistribution. Only a politician can, and should, chose between A and B.

This, however, does not justify the systematic substitution of economic expertise by political posturing that seems to prevail in many decision-making processes. The consequences of many investment projects are often complex and counter-intuitive. We cannot assume that politicians are always fully informed of what their choices entail. Saying that they are the ones who can weight and arbitrate between conflicting values is one thing. Saying that they can short-circuit analyses that could provide them with the adequate information is a different thing. The temptation to do so is great, but it should be resisted.

Conclusion

This does not mean that all big projects are bad, that some transborder projects are not much needed, that all rail projects are wasteful, that all transport investments should be stopped, and that politicians have no role to play. The opposite is obviously true. But it does mean that yielding too easily to these common temptations is indeed dangerous. A 15 billion € transport project like the Lyon-Torino tunnel, that embodies all these five features, is likely to be detrimental to the growth of Europe.

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