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TRANSPORT INNOVATION AND ECONOMIC REGULATION: A COMPLEX RELATIONSHIP

-- Paper by Professor Marco Ponti --

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-- By Professor Marco Ponti --

1. The more relevant impacts of regulation on the land transport sector

1.1 The origins

1. The origin of market regulation is assumed to be connected with the Sherman Act set out in the United States (US) in 1890. In the following century, its impact on transport has been very important, beginning with the famous action of the railways against the "unfair" competition from the new-born trucking industry (actually, the railways were themselves found having monopolistic behaviours).

2. Extended nationalisations happened in other countries both for local transport and railways, suffering from increasing losses and facing keen competition from road transport. In the US, passenger transport almost disappeared, given the low level of subsidies.

3. Even technical progress shifted from railways to road transport, that in Europe and Japan become more and more taxed, in first place from income distribution concerns, and later from environmental reasons. In the railways, the private sector remained heavily present only in American freight transport. Here the Staggers Act of 1980 generated an important improvement of the efficiency of freight rail, but connected with some problems related with infrastructure charging (perhaps too weakly regulated).

4. Toward the end of the century, in Europe an effort to re-introduce competition both in railways and in local public transport met with very limited success. Only in the United Kingdom (UK) the liberalisation of railways was a substantial success, but not for the infrastructure (as could have been expected, being a natural monopoly). In France, the high speed train system (HST) was launched with good success, both in economic and financial aspects, on the main north-south link of the country.

5. Taxation on road transport increased for environmental reasons, in parallel with the level of subsidies for railways, due to a very strong political defence of their role, even if substantially declining, notwithstanding these taxes and subsidies.

1.2 Recent developments

6. In this century, innovation in land transport came mainly from the road sector: the reduction of unit health-damaging emissions has been spectacular (even if not so for CO2), as spectacular has been the reduction of accidents. Very recently, in Europe a partial liberalisation of long distance buses has generated a sharp increase both of services and of traffic, at no cost for the public purse. Internet-based taxi and car-sharing and car-pooling services are also major innovations.

7. In the rail sector, not much innovation emerged. Within a general picture of rail traffic decline, High Speed Trains have seen a rapid worldwide expansion, still with some good success, but far from everywhere, and at enormous public costs for the new infrastructure. Since for the two land transport modes the available public resources are not an explaining factor, being in general abundant for railways, and the contrary for road transport, it is not avoidable to link these performances with the low degree of competition in the rail sector, and the almost complete liberalisation of the road sector.

8. It is useful to signal here that there are two main aspects of economic regulation that may have a role in innovation: the ones dealing with organisation and management, and the ones generating implicit incentives for technical innovation. They are far from being entirely unrelated, but it is expedient to look briefly at them separately.

2. Market regulation for roads

9. Markets are fairly competitive in the road sector, both at the level of the services provided, and at the level of the production of vehicles, with limited exceptions: local bus services, some barriers for international trucking services, and taxis, struggling to defend themselves from UBER-type competition. The environment issue is a component of modal competition within the transport market: in Europe and Japan the "polluters pay" principle has generated taxes that, jointly seen with rail subsidies, change heavily the relative final prices of the two modes. Toll highways are often tendered out as private concessions, and sometime with disappointing or exploitative results. But up to now not much technical progress can be seen in this infrastructure, if not for some semi-automated charging technologies.

3. Market regulation for rails

3.1 An overall picture

10. In the US, there are private and often vertically integrated freight companies, with limited competition, and an apparently weak regulation, given some recurrent protest from "captive" large local users (grains, coal, etc.).

11. Passenger services are limited and subsidised (Amtrack), even at a level far inferior than in Europe, with no intra-modal competition.

12. In Japan, the sector is kept entirely public and without competition, and local services have been separated on regional basis, with a successful financial scheme that has helped in reducing the extremely high losses incurred in previous periods.

13. In Europe, free competition within the rail sector is also limited, even if slowly growing. Competition in the market does exist for freight services, and for regional services in the form of "competition for the market" (*Demsetz competition*), i.e. temporary concessions given through competitive tenders. Actually, in the rail sector there are a few technical problems also for service liberalisation (economies of scale and scope, high sunk-costs, "learning curves", etc.), but the main ones are political (national public companies, "votes of exchange", the defence of national suppliers of rolling stock, etc.).

3.2 Possible actions

14. The scope for more market-oriented regulation remains wide indeed, especially in Europe.

15. The very first step is the real separation of the infrastructure, a "natural monopoly", from the services (that are not natural monopolies, even if there are some technical problems, as we have seen above, in the unbundling process). Today this separation, made mandatory by the European Commission at the end of the past century, is mainly formal. The owner, the State almost everywhere in Europe, remains the same. If this separation has to become a real one, the (gradual) privatisation of the services seems a required condition.

16. In a further step, even the operation of the infrastructure can be tendered out, and eventually subdivided geographically in order to have some form of "yardstick competition" (on top of a reduced "political clout" of the concessionaire).

17. Long-distance passenger apparently shows no problem in competing in the market too (Italy is a good example of this statement, even if limited to the HST services). Regional services can become the main field for services provided with competitive tendering, as seen. Germany shows a definite success in this strategy, even with minor foreign companies providing local services.

18. Nevertheless, two regulatory issues remain wide open. One of the main tenets of fair competition is a level field. Today the field is not levelled at all: the tariffs in place for the use of the rail infrastructure are based on strict short-run marginal costs, and as a consequence are very low. The ones for the competing infrastructure, toll highways, are in general based on average costs (Germany is an exception, where highways are free of charge, if not for trucks for environmental objectives, via a satellite-based charging system).

19. As known, in the average cost pricing, the tariffs cover at least part of the investment cost, and the full cost of maintenance.

20. In second place, an important and crucial regulatory issue is related to "horizontal integration of dominant firms": railway companies tend to enter the long-distance bus services (and in some case, also the urban public services). Within the "classical" regulation model, as far as entry remains free of barriers for these other services, the problem is limited. But within a more up-to-date regulatory approach, based on the concepts of "capture" and "clout", the resulting picture is quite different, especially if the dominant firm is monopolistic, public, and subsidised, like European railways companies generally are.

21. In this context, both "capture" phenomena and inefficient cross-subsidies are clearly a relevant risk.

22. An enhanced European level of competition, and less state interference, may well generate some "surprise", similar to the unexpected development of the low-cost air services, consequence of a limited opening-up of competition in that sector.

23. Even of a different nature, for railways a further severe economic problem remains: the "willingness to pay" of the users, both for passengers and freight, that seems very low indeed. Actually, without heavy subsidies both for investments and operations, a large part of the European rail system will collapse (set aside the HST services, and a few commuter services in high-density areas). The other services will be substituted by long-distance buses for low-income users, low-cost air services for long distances, and trucks and private cars, that tend to become far less polluting due to the technical progress already well under way, without costs for the public purse (less polluting vehicles, in general are paid by the users). A large and recent IMF research demonstrates that in Europe already now the fuel taxes are covering, at least in average, all the external costs that are one of the main justifications for a large part of railway subsidies, and for public transport in general.

4. Technical aspects of regulation for road transport.

4.1 An overall picture

24. For road transport, the future looks rather near. The informatisation technology (ITS) is basically already here, non-polluting motors are near, while fully automated driving probably is just a little farther (in the order of 5 to 10 years).

25. Let's start with ITS. Satellite-based traffic control and charging has been already tested with success, transponders are now extremely cheap, and largely in use for freight control and road tolling. Transponder-based vehicle plates will be easy to introduce.

26. But the main issue concerning regulation is the taxis and shared (public) services in general. UBER, BlablaCar and similar brands are expanding at break-neck speed. European regulation, that tends to be more protective of labour, have up to now severely limited UBER-type innovation, but the fact that UBER is now present in 480 cities in the world suggests that the pressure is on, and that the protection of present taxi drivers can be gradually reduced, with some reasonable compromise, in favour both of the users and of new-entrant part-time workers.

27. Car-sharing is also on the rise, even if its impact is by definition more limited to high density cities.

28. Bus services "on demand" will be a next step.

29. Non-polluting motors are the second innovation well on its way. The role of regulation in this development has been only a partial one. Actually, this innovation has been mainly the combined effect of fiscal and industrial policies, both driven by environmental concerns.

30. On the fiscal side, the impact has been generated in Europe and Japan by the very high taxation on gasoline (about two-thirds of its final price), while on the regulation side it has been the effect of emission standards. Setting standards is in theory far less efficient than "pigouvian" taxes (since this policy ignores the different individual opportunity costs involved in a mandatory standard), and actually it has been the result of a negotiation with the car industry, that prefers the standards to taxation, given its effect on accelerating the fleet renewal. Anyway, it looks an acceptable compromise.

31. Fully automated driving is also nearby in terms of the related technology, but less so in terms of the opening of the market for fully driverless cars and trucks. Responsibilities and the related insurances are strictly entangled, and the technology has to prove yet the real level of risk involved. Delicate moral issues are also present, on the safety side ("to kill a suddenly-crossing pedestrian or to risk my own life with a blind overtaking?"). But the way ahead seems clear enough: "assisted driving" can gradually grow to fully automated, with the licenced driver firm behind the wheel in a first phase. Than the combination of the developments of legislation, technology, and the gradual "downgrading" of the driver licences needed for automated vehicles, will bring us there.

32. Roads may also help with the installation of devices aimed at various objectives, beginning with highways and long-distance traffic, far more regular and steady than urban traffic. Three technologies seem to be the more promising here: electric power from over-head cables, from the pavement via induction or generated by the vibration of the vehicles, and systems of electronic buoys helping and controlling automatic driving.

33. The resources spent by private companies in this field are huge, competition is keen, and these two factors combined generate a promising picture.

4.2 Future perspectives

34. Nevertheless, the real medium-term promising picture is in the combined effects of automatic driving, clean motors, and ITS.

35. Clean motors in first place will involve the sharp reduction of a large part of the present operating cost of cars and trucks: fuel taxation. Automatic driving and ITS will mean a further reduction of costs for trucks and taxis. This, setting aside the social benefit on pollution and road accidents, 90% related to human behaviour.

36. This picture implies the disappearance of traditional taxis, but also a reduced demand for public transport, set aside HST that are actually comparable and competing with air services. Demand will rise for automated car services also from non-drivers, especially elder people, worldwide on the rise.

37. As a consequence, a very severe problem of traffic congestion may emerge. But the possible answer is already available: widespread congestion charging, made easier by ITS, and much more efficient and equitable than the attempt of intervening via subsidies to public transport. In turn, congestion charging, given the high willingness to pay of road transport users, can generate large resources for road improvements, even subterranean, like it is shown by the very successful cases in Marseille and Oslo. Environment-related worries will be no more present, or irrelevant, in this future picture. The public purse will not be much burdened, since the users will pay through the above-mentioned congestion charges.

38. About the future role of road subsidised public transport (mainly local), there is a remaining possible argument in its defence: income distribution.

39. Even this objective is far from solid, if used against the liberalisation of the sector. Subsidising the service means subsidising also the rich users, very abundant in urban centres, that are by far the better served places for technical reasons (density of functions and residences). Helping the poor is perfectly possible through "aimed" discounts for low-income groups. But a fully liberalised public transport may well generate other types of problems, like "spatial monopolies", instability of supply etc.. In order to avoid this risk, it is always possible to enforce competition for the market (competitive tendering of services for a limited period of time).

5. Technical aspects of regulation for rail transport

40. Here, there is the risk that market pressure alone will not be sufficient to set in motion important innovations, for two reasons. The first one is technical: the system is rigid, with heavy sunk costs, difficult to unbundle (as we have seen) and, much more than the "fragmented" road sector, requires unified standards. In Europe, one of the main possible innovation is automated coupling, that allows for much heavy trains. It exists already from a century in the U.S., but requires a strict coordination and heavy investments.

41. In the railways, also almost full automation of the system is much easier than in the road sector, given a single dimension of motion in play (against two on the roads, and three in the air). And this may generate severe problems with a highly unionised workforce.

42. In general, if an extended public action is required, it will conflict with the privatisation process.

43. On top of this, if the market of rail services becomes more open, but the main companies remains owned by the state (or by regions), another obstacle has to be removed: the "residual claimant", i.e., the certitude to be bailed-out. Especially for large companies, that are technically justified by the economies of scale present in the sector, the "too big to fail" principle may well reduce the modernising impact of the market pressure.

6. Tentative conclusions

44. In summary, it is far more efficient and equitable to aim directly to market failures within the sector, than try to use limits to competition for the same goals. For the environment, the "polluters pay" principle is already here (at least in Europe and Japan), and will become less and less justified with more clean technologies. For congestion, road charging is far more efficient, and will be made much more easy to implement and to fine-tune via ITS (satellite-based devices, mandatory transponders, etc.). For income distribution there are equitable and efficient alternative to subsidies for the often-inefficient monopolistic public providers.

45. In this way, regulation may well accelerate competition without "social remorse", leaving the innovation to the implicit market-driven incentives, without any temptation of "picking the winner", but just to monitor carefully its development, in order to avoid in time the quite frequent problems of innovators building up monopolistic positions.

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