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Regional Railway Passenger Transport in Leipzig Region : Opening to Competition and Operating Costs analysis

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Abstract :

Opening to competition in regional railway transport in Germany is interesting to investigate as some countries of the European Union, for example France, have difficulties to move forward towards the implementation of European Union Guidelines. In this paper, we investigate the opening to competition of regional passenger rail services in Leipzig Region between 2009 and 2013, time of the opening of the new underground City Tunnel in city center of Leipzig which means a new transport plan. We are evaluating the costs structure of operating regional rail passenger transport before and after competition. We show that the introduction of competition in Leipzig Region will reduce the level of subsidy by 20 % also with an improvements of productivity of the incumbent operator.

Introduction

The European transport sector is undergoing profound changes at the present time and specifically rail transport (Link, Nash, Nilsson, 2012). Faced with the threat of global warming, the annoyance of noise, pollution from cars and heavy goods vehicles (HGV), urban congestion and road safety's related problem, rail travel offers new appeal for a move from road to rail, for passengers as well as for goods (Nash, 2010 ; EC White Paper, 2011). Formerly presented as a typical example of natural

monopoly in the theoretical literature on public economy (Walras, 1875), it has been decided, under the impetus of the European Community and of pioneering countries (in particular Sweden), to separate the transport services of transport from the management of the infrastructure and, in order to reduce the level of public subsidies, to open the exploitation of rail transport to competition (Crozet Y. et alii, 2011a ; Nash C. et alii, 2005 ; Preston J. and Van de Velde, 2012 ; of Alexandersson G and Hulten S, 2007 ; Guihéry L., 2011 et 2004). The network, on the other hand, remains within the regulated framework of natural monopoly, which can be directly managed by public authority (RFF – France) or indirectly (Germany via the subsidiary company DB Netz part of DB AG holding ; the United Kingdom with Network Rail, a private company but under the control of the *Office of Rail Regulation (O.R.R.*).

Competition is then now, in some countries, for instance Germany and U.K., the leading motor of innovation and regulation of tendering for railway regional passenger services. Some countries have difficulty to follow the "front train", for instance France. Learning experiences from the leading countries, assessing the introduction of competition, best practices strategy, scenario for competitive implementation, are now on the agenda of researchers, public policy makers and politicians. This paper on the evaluation of the opening of competition of rail passenger service in the region of Leipzig (Germany) has to be understood in this framework.

Section 1 will highlight the objectives of the European railway reform's packages and the diverging trend among many member states of the EU. Section 2 and 3 will, in the perspective of looking to "best practices", describe the first results of the introduction of competition in the regional railway passenger network of Leipzig. The 2009-2013[1] new transport plan is indeed shared by DB region and MRB (Mitteldeutsche Regio Bahn from Veolia Group) : traffic, quality of service, compared DB – Newcomer MRB costs analysis in regional railway passenger transport, type of contracts and incentives, role of subsidies and way to limit it, perspectives in the future,… The process of negotiation of the new transport plan has implied a reduction of 20 % of the costs for the same amount of train.km which is interesting facing scarcity of public money but also an increase of productivity of the incumbent operator, the DB AG. Conclusive remarks will open the discussion of the future of the great railway reform in Germany and Europe for a better urban and regional mobility : deepening of regionalization, future of regional competition facing scarcity of rolling stock materials and public money,…

[1] Before the opening to competition of the new Leipzig City Tunnel in December 2013.

1. Rail reform in Europe : diverging experiences but convergence of learning and "best practices"

New European rules have therefore been created to regulate new entrants' market access to the rail market (Smith et alii, 2010 ; of Alexandersson G. and Hulten S., 2007 ; Burlando et Guihéry, 2004), with respect to safety regulations and the interconnections between the different Member States of the Union (for example in implementing the ERTMS standards) :

- reciprocity of rules governing competition between European countries
- rules on pricing for use of the infrastructure (Nash, 2009)
- on taking into account public service missions (European Directives on Public Service Obligation)
- on the decentralisation of regional passenger services (Faivre d'Arcier, 2011 ;Nash and Nilsson, 2009 ; Link, Nash, Nilsson, 2012 ; Wewers, 2009).

These rules were implemented through four "rail packages" and are typical of the work of the European Union in the field of transport:

- Directive 91/440 (19 may 1991): split infrastructure network
- First package: 2001/12, 2001/13 and 2001/14 : 26 February 2001: freight transport opened to competition
- Second package: 2004/49, 2004/50 and 2004/51: regulation 881/2204 : 29 April 2004: interoperability and rail security; freight railway transport totally opened to competition
- Third package: 2007/58 regulations 1370 and 1371: 23 October 2007: opening to competition of railway passenger transport
- Fourth package in discussion at the end of 2012

If the new European rail framework seems balanced, implementations of these rules within the Member States might be quite different, breaking sometimes the principle of European reciprocity : for example in passenger regional rail transport in France (no competition at this time) and Germany (competitive tendering with French companies involved).

At the heart of Europe, Germany (Wewers, 2009) stays ahead together with Sweden, the Netherlands, maybe with Italy while France is making careful progress (freight) or even stepping backwards (Regional passenger rail transport : see table nr.1). This fact raises real reserves and even lively criticism on the part of our European partners who see the SNCF (via its subsidiary company Keolis for public transport or Geodis for the transport of goods by road) and private French operators (for example Veolia) winning calls for tender from freight services or travellers throughout Europe,

and particularly in Germany, while the French market is only opened to competition for freight at present. International passenger transport should have been opened to competition in France at the beginning of 2010, mainly in continuity with an international link (Italy – Germany or Spain – Germany with stops in France, particularly in Lyon, Marseille and Paris) but the SNCF's "market power" together with the financial crisis have prevented newcomers from entering the French market. This lack of reciprocity, at the centre of the European Union and between two key players of the European integration, is at the basis of many misunderstandings today.

Table 1 : Railway competition today in Germany (and France)

Market shares of newcomers (2010)		Trend
Freight	25 % (France: 20 %)	+
Regional passengers	22 % (France: 0 %)	=
Long distance passengers	Less than 1% (France: 0 %)	+ in Germany (and intermodal competition with long distance Bus in Germany - In France (Low cost TGV managed by… SNCF or Bus managed by… SNCF)

Source : DB AG, Wettbewerbsbericht 2011

Facing these diverging attitudes, comparing experiences in railway operation all over Europe is today one of the favorite activities of researchers, trying to learn from each other and evaluate the results of competitive railway operation. This research framework is linked with the idea of "best practices" for the railway actors and public policy makers. This statement is particularly right for regional passenger transport and our paper will be linked with this framework and will then investigate the opening to competition of rail passenger services in Leipzig region. In the framework of the European reform of railway transport, Germany, on the issue of competition, is moving in advance. Learning from foreign experiences, such as in Germany where more than 350 train operators are active on the railway market, can help public decision-making in Europe.

2. Regional railway passenger transport in Germany and in Leipzig Region

Railway competition in Germany is the leading motor of market adjustment, but "Daseinvorsorge" (Public Service Obligation) and limitation of public spending are the framework in which this competition among operators occur in Germany today. Competition can be observed in four direction :

- Competition for the tracks : competitive tendering
- Competition on the tracks : "open access" issues
- Spatial competition, connecting North and South Germany for instance in freight(corridors).
- International competition with SNCF on International Services.

Passenger regional railway transport is particularly successful in Germany. Competitive tendering is the main way of allocation of rail operations since the decision of the main Administrative Court (*Bundesgerichtshof)* in February 2011. More than 30 railway operators are actively engaged in passenger regional transport in Germany, and the German Passenger Rail market is becoming the « battlefield » of all European Operators. The main motor is then the run « for the market », which regional tender being offered between 5 and 10 years. To sum up, we observe an increase in railway passenger supply, an increase in travels, innovation in tickets, marketing and services (reservation of place possible in regional transport). But the key issue is that public subsidies for passenger regional transport have been reduced : in 15 years in Germany, passenger.km have been increased by 55 % (to 47 billion pass.km) and train .km increased by 26 % (to 630 billion trains.km). Decrease in costs by around 26 % have been assessed by Transport Authorities. Between 1996 and 2009, subsidies have been reduced by 6 % in real values : « less money for more services » is often expressed by experts on this topic. For 1 € (in real values), the Länder are offering 37 % more in services (2010/1996). The total level of federal subsidies for Passenger Regional Transport in Germany is estimated to 7 billion € / year. It means the cover of around 60 % of the spending.

<u>Key data for Germany :</u>

Regional passenger market : 641 million train.km in 2011 (+8,5% in comparison by 2000).

2011 : 40 % of tendering are based on competition (in this framework, 65% on the train.km are won by newcomers). 60 % of the contracts are based on direct negotiations between transport authorities and operators

DBAG in 2011 : 76 % market share in trains.km ; 24 % for newcomers but this represents only 12,5 % of the passenger.km. In 2012, the market share of the DB AG on new tender in trains.km is about 41

%, 32 % is going to pour VTD/ Trenitalia / Benex et Keolis anf 27 % other. The passenger railway regional market is then really opened.

Leipzig experiences :

In this perspective, the Leipzig region is interesting to study for many points : First, Railway transport started in Germany, in long distance, in Leipzig in the first half of the XIX century under the action of F. List who suggested the development of a railway network for Germany (1835-1837 : Leipzig Dresden Eisenbahngesellschaft – LDEC) and construction of the first line Leipzig - Dresden[2]. In this perspective, our presentation will try to follow « F. List footsteps » for more European benchmarking, integration and feedbacks from member states to improve European public goods and services.

Secondly, Leipzig is a very innovative city, historically based on trade, fair (« Messestadt ») and open mind. This city was, since 1815, a crossing and exchange point between the Kingdom of Prussia in the North (Province Saxe in Prussia with Halle) and the Kingdom of Saxe in the South (Dresden). In 1989, Leipzig was the start of the freedom revolution in the former DDR (see the « Demonstration » around the *Nikolaikirche)* and is now one of the most dynamic city, culturally and economically in East-Germany. Leipzig can be now considered as one of the most dynamic region of East Germany : it can then be interesting to see which types of structural railway transport innovations (services, type of franchise contract, process of negotiation, infrastructures development like the new City Tunnel Leipzig (CTL) and its impact on the new transport plan) Leipzig region has implemented in railway regional passenger transport.

Two main changes in transport policy occurred in Leipzig the last 5 years :

- The building of a new city tunnel (CTL : four new undergrounds train stations in city center connecting the northern railway network with the southern network) for the regional railway network which will not stop any more and turn back in the superb, huge and old train station of Leipzig (“dead end” station). This CTL has a long history and many attempts were made before to connect the former five or six independent regional train stations and networks in old Leipzig (see 1893 : first project of a « *Hochbahn* »; 1913 : start of the first tunnel (200 m) interrupted by the first world war ; 2013 : new CTL).

[2] See « *Das deutsche Eisenbahnsystem ist in Leipzig auf die Welt gekommen* » (Haase, p. 212). First train on the line : Leipzig -> Althen : 24.04. 1837

- The opening to competition of the transport in the region of Leipzig : in 2009, the transport authority ZNVL launched a new transport plan before the opening of the City-tunnel planned in 2013. Two operators are now involved : DB Regio and Mittel Deutsche Regio Bahn (Veolia Gruppe). In this paper, we investigate the operating costs of regional transport companies under this new competitive environment : cost of DB Netz tracks and stops in stations, energy costs, cost of rolling stock materials, costs of employees, marketing or structures costs, profit,… This work was not easy as information is becoming confidential in the railway sector.

3. Methodology of research and evaluation of the first steps of competition in rail passenger transport in Leipzig Region

The methodology of research was based on cross check, comparisons, evaluations and interviews within the transport authority (ZNVL) and the operators (DB, Veolia). The methodology is typically bottom up as these data are considered as confidential by the two transport operators involved.

The railway network of Leipzig Regio represents around 4 000 km² und one million people are concerned. We consider 110 stations for a network length of 500 km and a rail transport service of 9,5 million train.km. The total budget is around 100 millions euros (so around 10 € / train.km). 50 000 people are travelling every day. Two operators are involved : DB Regio AG and Veolia Verkehr Regio Ost GmbH (Brandname : Mitteldeutsche Regiobahn).

Competition started in december 2009 – 2010 on the network. A new contract will be launched for the opening in 2013 of the new City Tunnel Leipzig which will totally change the supply of regional railway transport in Leipzig Region.

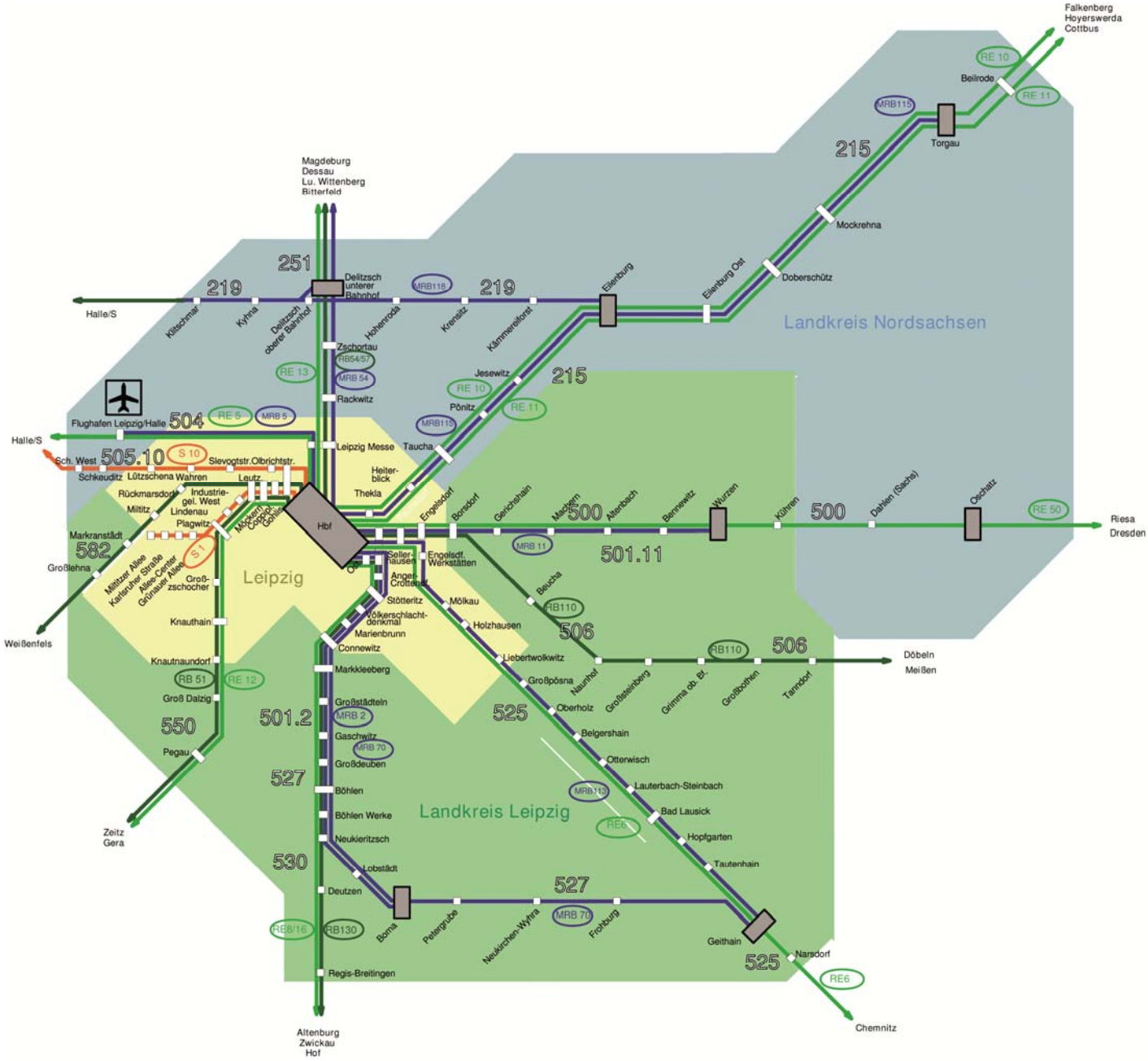
The results of this tendering has implied a reduction of subsidies by around 20 % , which means a gain of 2 millions trains.km every year for the same amount of public subsidies.

The following graph Nr.1 is presenting the network of the Leipzig Regio before the opening of the City Tunnel in 2013.

The graph Nr.2 is presenting the new framework of the region train service after the implementation of the City Tunnel which will set up a new supply of regional transport plan. One of the most interesting issue is the move from the splendid and huge train station of Leipzig (“Kopfbahnhof”), one of the biggest train station in Europe with a rich history of regional integration, toward a new city

tunnel (CTL) where trains will not have to stop and start back in the opposite direction. Between 10 and 20 minutes will be gained by crossing Leipzig with the tunnel (Guihery,2012).

Graphe 1 : Leipzig Regio network before City Tunnel Leipzig and under competitive operation



Source : ZVNL, 2010 ; In bleue : Veolia ; In Red : DB Regio.

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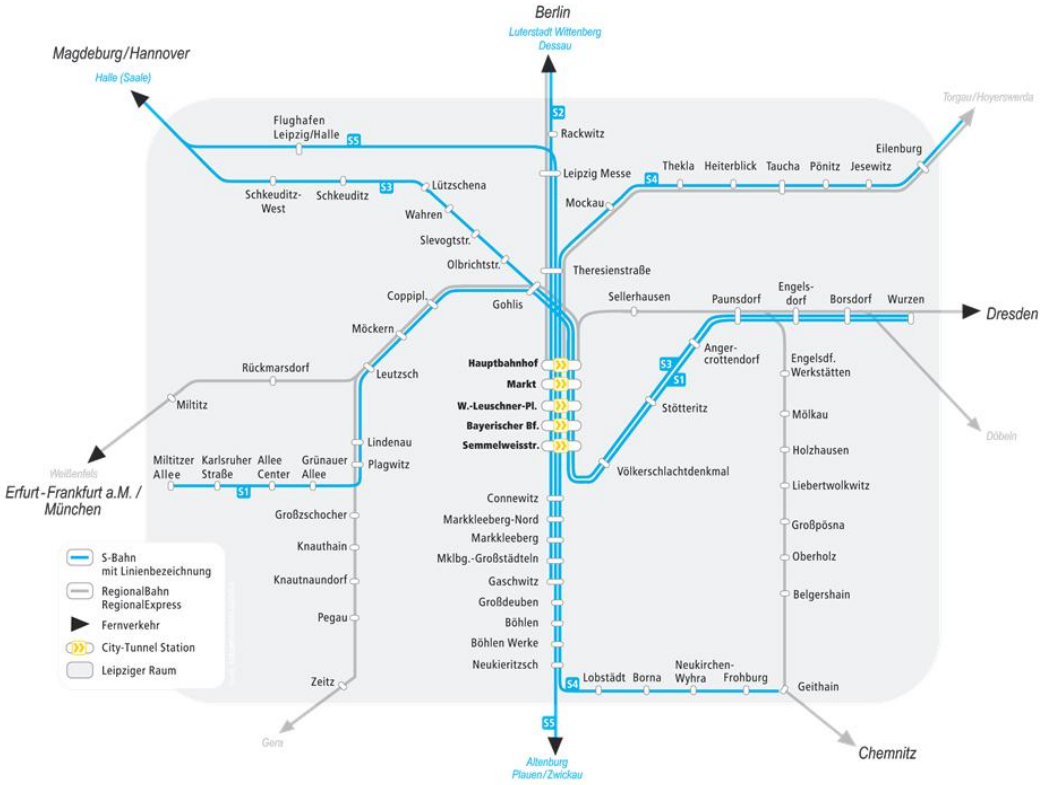
Graphe 2 : Leipzig Region network after City Tunnel Leipzig



Source : discussion, cross-check and reviews following a technical visit from the author at the invitation of the Ministry of Economy, Labor and Transport from Land Saxony, 4 May 2012 ; Note : DB Regio won the tender after the opening

Operating costs in Leipzig Regional Passenger Transport under competition framework

The following tables try to evaluate the cost structures of operating a regional passenger train in Germany. Our analysis is based on the following research object :

Data : 2009-2010 on the Leipzig Region Network

Supply : 9 to 10 million trains.km ; Tickets : around 25 % of revenues ; Costs in terms of pass.km : 8 - 10 cents / pass.km in 2010.

Table 2 : Estimation of infrastructure costs in regional railway operation in Leipzig Region (million €/ year and in % of total)

Traffic 2010	**Cost of tracks**	**Stop in stations**	**Total**	**TOTAL**
6 – 7 millions trains.km / year	25 -30	10 – 15	35-45 (1)	5 – 6 €/train.km
	30 – 35 %	10- 15 %	Around 45 %.	

Source : investigation in Leipzig – 2009-2010 ; discussion and cross check

Infrastructure costs (tracks allocation and stations) is about 40 – 45 % of the total operating costs of passenger regional transport, it means around 40 million € for 6-7 millions train.km : 5-6 € / train.km

Table 3 : evaluation of operating costs in regional passenger train in the Leipzig Region (in million €/year and in % of total)

Traffic 2010	**Capital Costs**	**Rolling Stock and maintenance**	**Energy costs**	**Employees costs**	**Overhead costs**	**Risks and profit**	**Total**	**TOTAL**
6 – 7 millions train.km / year	20-24	5 – 6	4- 5	5,5 – 6,5	5,5 – 6,5	1,5 – 2,5	41,5 – 50,5 (2)	6 – 7 € train.km
		30 %	6-7%	7 %	7 %	1-3 %	Around 55 %	

Source : investigation in Leipzig – 2009-2010 ; discussion and cross check ;

Operating costs of regional passenger train without infrastructures charges amount to 6 – 7 € by train/km and represents around 50/60 % of total cost (41,5 to 50,5 millions €). Employees costs is around 10 % (7% in Leipzig which is in East Germany where wages are lower than in West Germany), capital cost and rolling stock leasing/financial costs around 30 %. Profit of railway activities is low, evaluated between 1 and 3 %.

The total cost structure (infra and operating) is about : 76,5 – 95,5 millions euro / year ((1) + (2), it means around 11 – 13 €/ train.km under competitive framework.

The following table 4 is showing the results of cost evaluation before (line DB before competition) and after competition (line competition). Revenues are the same before and after competition : between 3-4 € / train.km, so a coverage ratio of around 30 %. DB in the table means own assessment because DB refuses to communicate its results. Before competition subsidies amounted between 9 and 12 €/train.km, after competition between 7 and 9 € / train.km. **Thank to competition, operating costs decrease by around 30-40 % - gain of productivity within the historic operator DB AG and lean management within the newcomer - and public subsidies decreased around 20 %. This is the main result of our research.**

Table 4 : summary of evaluation of costs and revenues of regional passenger transport in Leipzig region

	Costs structures of rail operator			**tickets revenues and public subsidies**				
2010	**Operating costs in €/ train.km**	**Infra costs in €/Train.km**	**Total cost in €/Train.km**	**Revenues in €/ train.km (tickets)**	**Public subsidies in €/train.km Before and after competition**	**Total subsidies**	**Traffic in Train.km**	**Benefit from tendering compared with statu quo en €/ par an**
DB before competition *(own evaluation)*	DB 10 – 12 €/train.km	[5 – 6] €/train.km	DB 12-16 € train.km	[3 et 4] €/train.km	**[9 – 12 €] €/train.km**	[65 – 70] million €	[6 - 7] million Tr.km	
Newcomer and DB after competition	[6 et 7] €/train.km *[See table before]*	[5 – 6] €/train.km *[See table before]*	[10 – 13] €/train.km	[3 et 4] €/train.km	**[7 – 9] €/train.km Benefit : 2-3€/train.km**	[50 – 56] million €	[6 - 7] million Tr.km	Entre 12 et 16 million €/year

Source : discussion and cross check ; DB for the incumbent operator, the DB AG or Deutsche Bundesbahn.

The result of this research are interesting : we find out that the introduction of competition in the Leipzig regional railway network has reduced the total cost of operation by 20 % and has increased the productivity of the transport services, due to the lean management of the newcomers, which push the incumbent operator to increase its productivity. Surprisingly, we come back to the result of the analysis of Alexandersson G and Hulten S (2007) and Alexandersson G (2009) on competitive tendering of regional and interregional rail services in Sweden (20 % reduction).

Before competition, the DB Regio cost war around 12 – 16 € train.km. Now the level of operating costs is, under competitive framework, around 10-13 € with revenues from ticketing from around 3-4 €/train.km and public subsidies from around 7-9 €/train.km (9-12 €/train.km before). It means a reduction by around 20 % of public subsidy.

If we consider that the level of operating costs of Regional Railway Transport managed at this time by SNCF is around 18-20 € / train.km, we can see the gap between France and Germany in the European open rail market...

Concerning employees costs, the following table 5 is proposing more details on the structure of employees costs :

Tableau 5 : evaluation of employees costs

	Train driver	Controller
Yearly wages	27-30 000 €	20-24 000 €
Working time	254	254
Holidays	30	30
Illness in days (about)	12-14	12-14
Working day/year	Env 210	Env. 210
Hourly annual work (8h/d.)	1680-1700	1680-1700
Hourly wages	16-18	
% employers charges	20 %	
Total cost with Social Security in €/h.	18-20 env.	
Evaluation in Euro for one hour.train.	[27-30]	[20-22]

Note : Security staff : 15-17 € for one train.hour ; Source : own discussion, cross checks,…

Concerning stations costs, costs are very different depending where the train is stopping. For 2007, DB Station & Services, we have :

Gare type 1, for example station of Leipzig : 39,19 € / stop

Gare type 3 (airport) : 19,73 €/stop

Gare type 4 : 2,22 € / stop

Gare type 5 : 3,24 €/stop

Gare type 6 : 2,8 €/stop

Transport authority of Leipzig (ZVNL) is expressing large critics against the calculation method of DB Station and Services (DB AG). ZVNL is paying around 12 million euros/year for stations and services stops (2007). For all Saxony, the sum amounts 40 million euros, it means 12 % of the Federal subsidies transferred for passenger regional rail transport. This amount is growing.

Table 6 is trying to show where we can find strategies for cost differentiations among transport operators under competitive framework. Lean management, profit, cost of employees if there is no common "Tarif" (in German), it means no common wages levels as it is planned in France for example – are the main factors of differentiation in regional rail passenger services in Germany. Rolling stock material seems to be indirectly controlled by incumbent operator, as they order train till saturation of production facilities of rail industrialists. Easy access to financial market is also a factor of differentiation as many operators are supported directly by European member State, as SNCF of Trenitalia for instance. Some problems of "discount" (for energy or stops in station) seems to exist also and can be considered as support to historical operator. Inquiry are on the agenda of Anti-Trust Administration.

Table 6 : where are the scope of cost differentiation among transport operators under competitive framework

	Network (DB Netz)	**Stop in stations**	**Energy**	**Rolling stock material**	**Maintenance**	**Cost of employees**	**Management Structure costs**	**Profit**	**Access to financial Market**
Differentiation variable in tenders DB AG/ Newcomers	NO	NO	YES/NO ? Inquiry in process of the EU /German antitrust law	NO / YES (Saturation of orders by DB AG)	NO (scale economics) Lock-in of DB AG in his own assembly shop ?	YES at the beginning NO now	YES	YES	YES (High critics against the public support of KEOLIS-SNCF in the German market)

Advantages (« Grandfat her right »)	? (Inquiry in process within the 4th package	NO	YES Discoun t : allowed by the EU?	YES (Saturation of orders among rail industrialist s)	NO ?	NO	NO	YES Cross financing ?	YES
Advantages to the newcomers			NO	NO	NO	Yes at the beginning NO now	YES Lean manage ment	NO	NO

Source : cross – checks, own discussions

Public budget constraint is also a risk for railway transport operator. Limiting budget spending for rail passenger services is now on the agenda of the regional government, which is in charge of regional railway transport policy with support from federal subsidies. The first January 2011, for instance, the Government of Saxony has decided to save 10 million € (1 million train.km), which has to be implemented rapidly by the regional authority for rail transport in the Region of Leipzig, the ZVNL. It means a reduction of around 500 000 trains.km for Veolia (MRB) and a reduction of around 400 000 trains.km for DB for 2012.

In December 2013, the new City Tunnel will be opened in the city center and will transform the all new regional transport supply. A new research has to be carried out for investigating the new regional railway services in Leipzig Region.

Conclusion

Opening to competition in regional railway transport in Germany (Leipzig Region) is interesting to investigate as some countries of the European Union, for example France, have difficulties to move forward towards the implementation of European Union Guidelines.

Competitive tendering is not easy in practice for all actors and is revealing many distortions in comparison with theoretical models. First, newcomers have no information and, as in the Leipzig experience, they have to wait at different stations to count the passengers on his own. Financial arrangements for renting rolling stock materials is not easy too and there are bottlenecks : historical operators are saturating the orders lists of rail industrialists for limiting access to new rolling stock materials for newcomers.

Tenders are very complex because of high expectations of transport authority : it should means in the future less competition because of less answer to tender or … strategic behaviors of operators. It is clear that strategic behaviors of DB and newcomers are now obvious on this market but difficult to assess.

Leipzig case study in regional rail transport is interesting to investigate because we face a double innovation process : on services for one side but also on infrastructure for the other side. For the next transport plan, the City tunnel could be considered as a risk and an uncertainty in a long term perspective for the newcomer (train stations costs for instance ? influence of the building company, linked with the DB AG, which is charge of the tunnel for instance ? Time of opening ? Long term contract required by the incumbent operator for buying new rolling stock materials compatible with tunnel ?). And Budget cut during operation can also be a risk.

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