
Contracts for Regional Rail Passenger Services in Germany: Some Empirical Evidence

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Overview

- 1. Regional Rail Passenger Services in Germany:
Institutional Framework and Competition**
- 2. Contract Awarding Procedures and Specifications**
- 3. Empirical Evidence of Some Contract Characteristics**

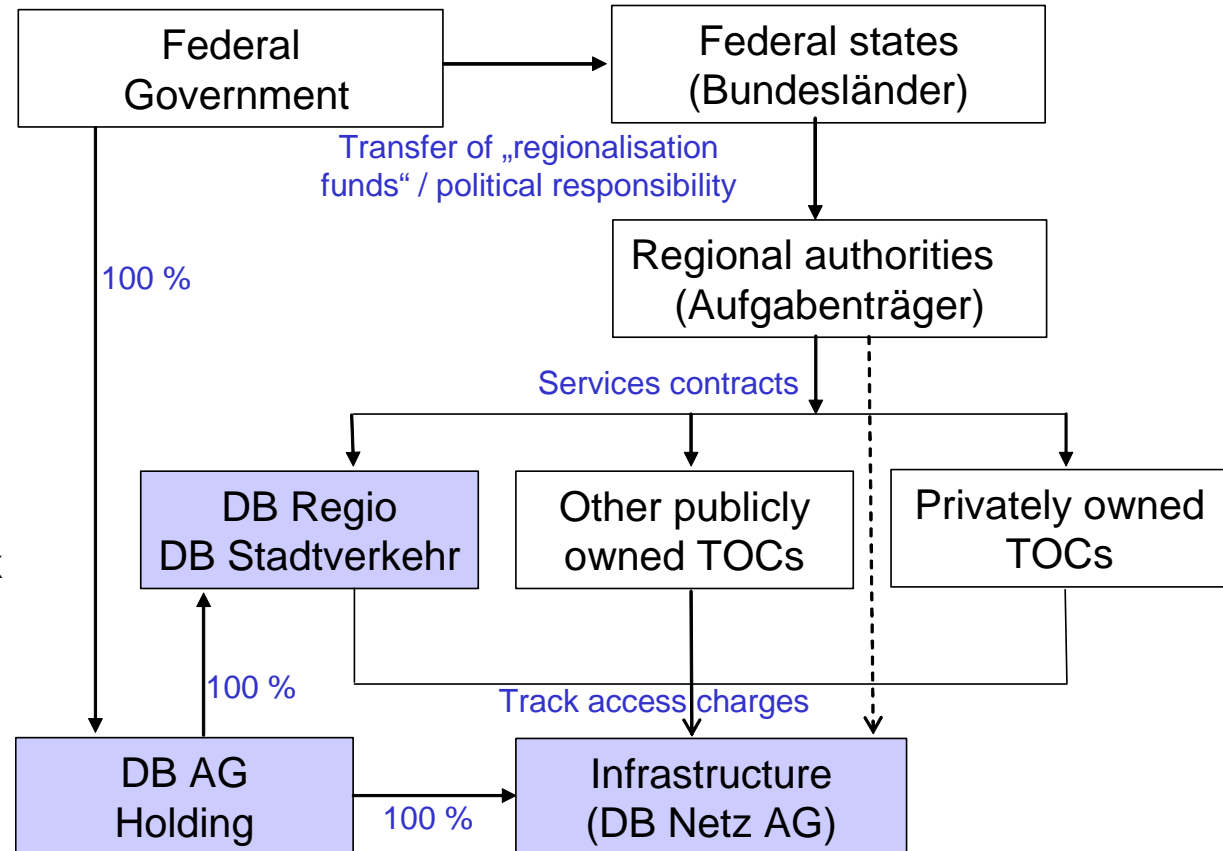
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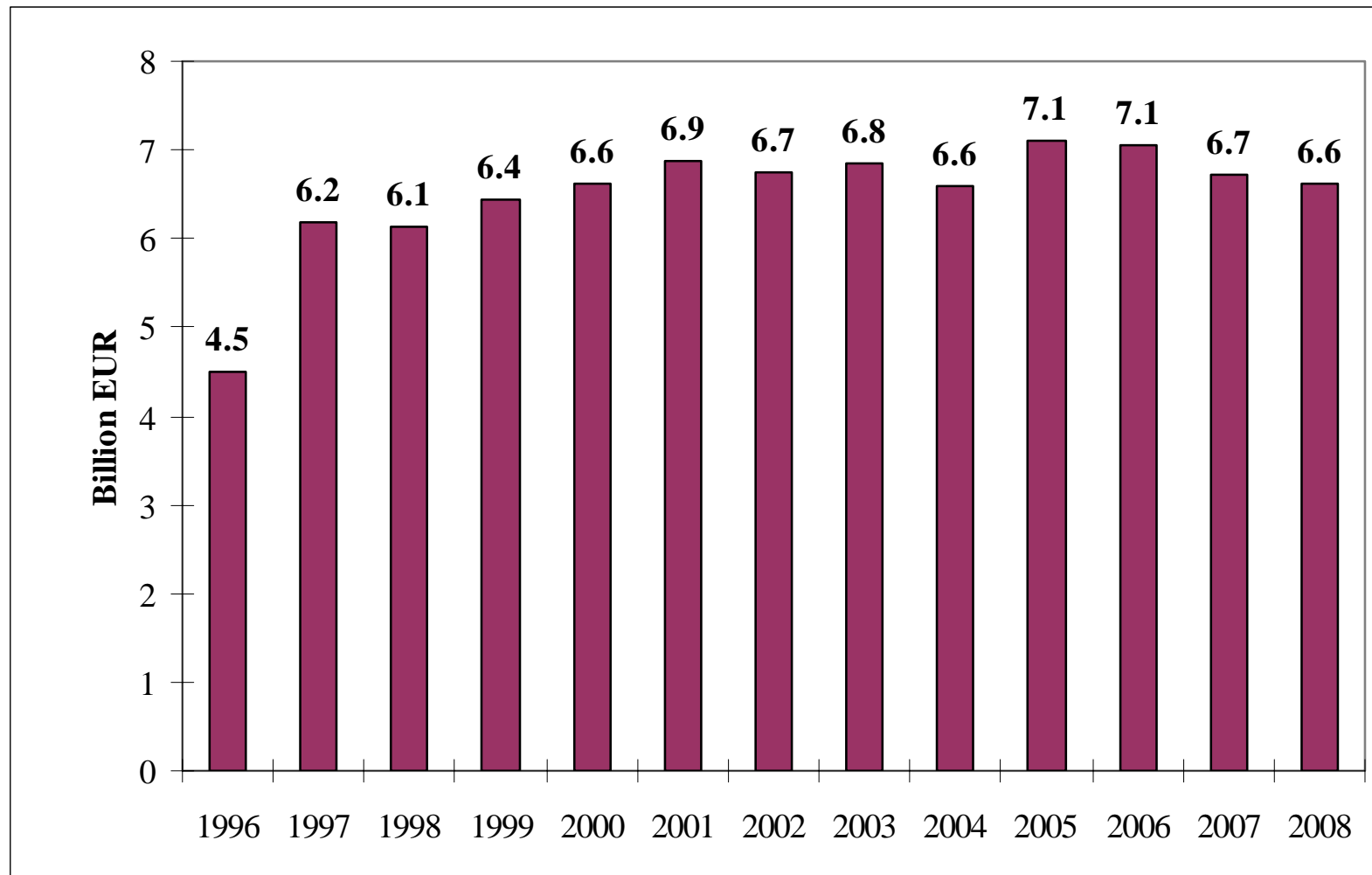
Regionalisation in rail passenger transport

Regionalisation 1996

- Part of the rail reform in 1994
- Responsibility for regional rail passenger transport passed to the federal states
- Regional Authorities (*Aufgabenträger*) responsible for planning and managing regional rail passenger services (approx 30 % cost coverage by ticket sales)
- Federal funding: earmarking of budgets for public local and regional passenger transport: initially € 4.5 bn a year, now approx. € 6.7 bn

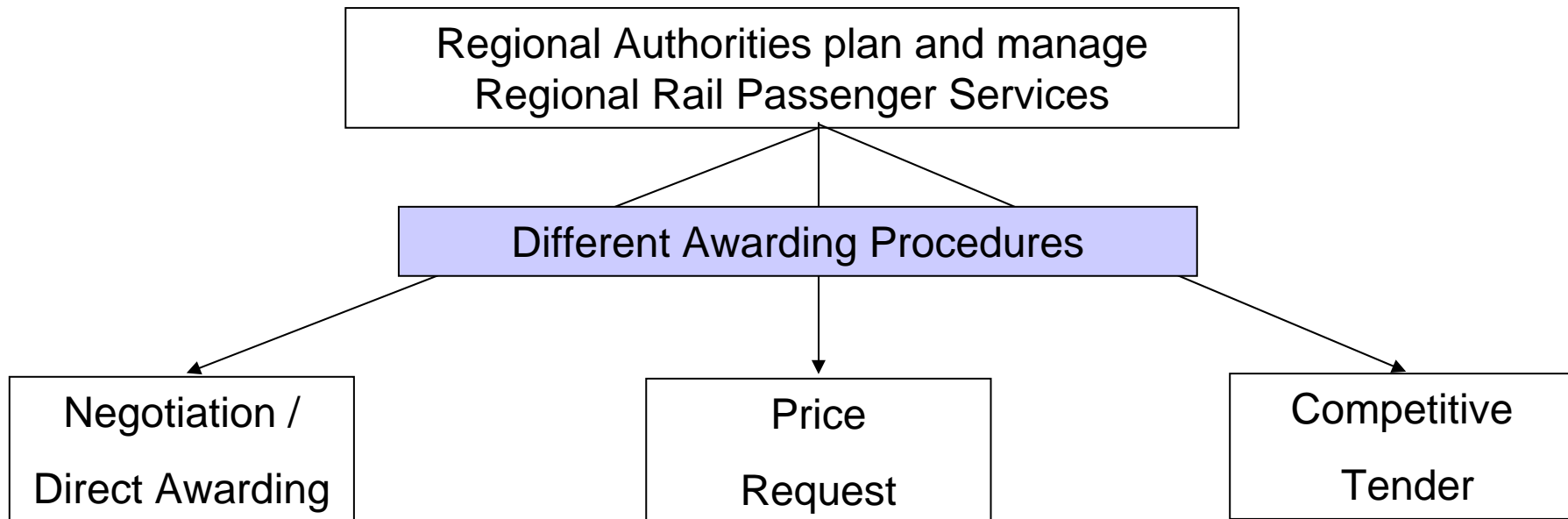


Development of Federal Subsidies



Sources: Deutsche Bahn AG (2003), Krummheuer/Hauschild (2004), Haushaltsbegleitgesetz 2006, Art. 13.

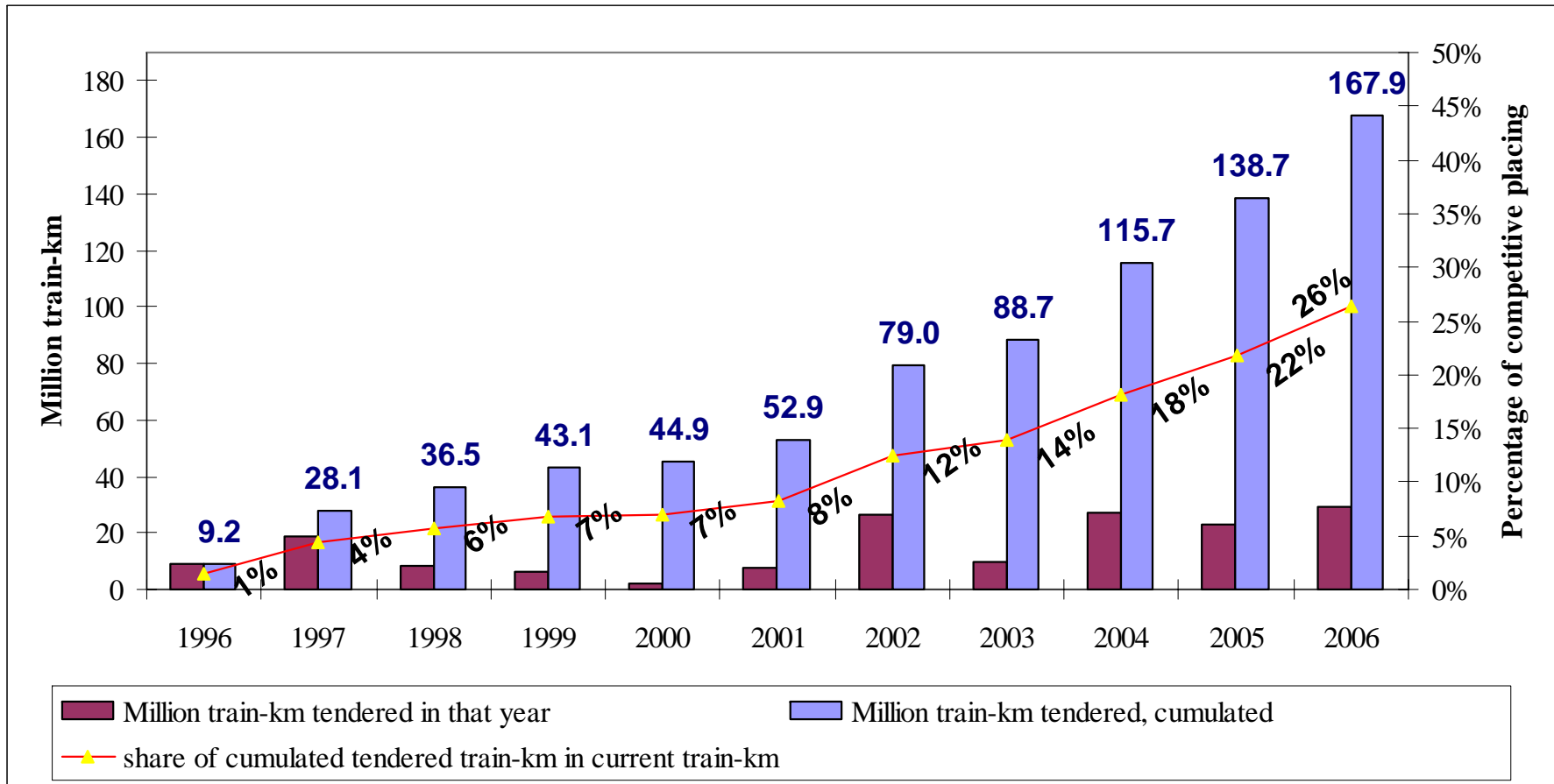
Legal Framework



Direct awarding of services to the DB

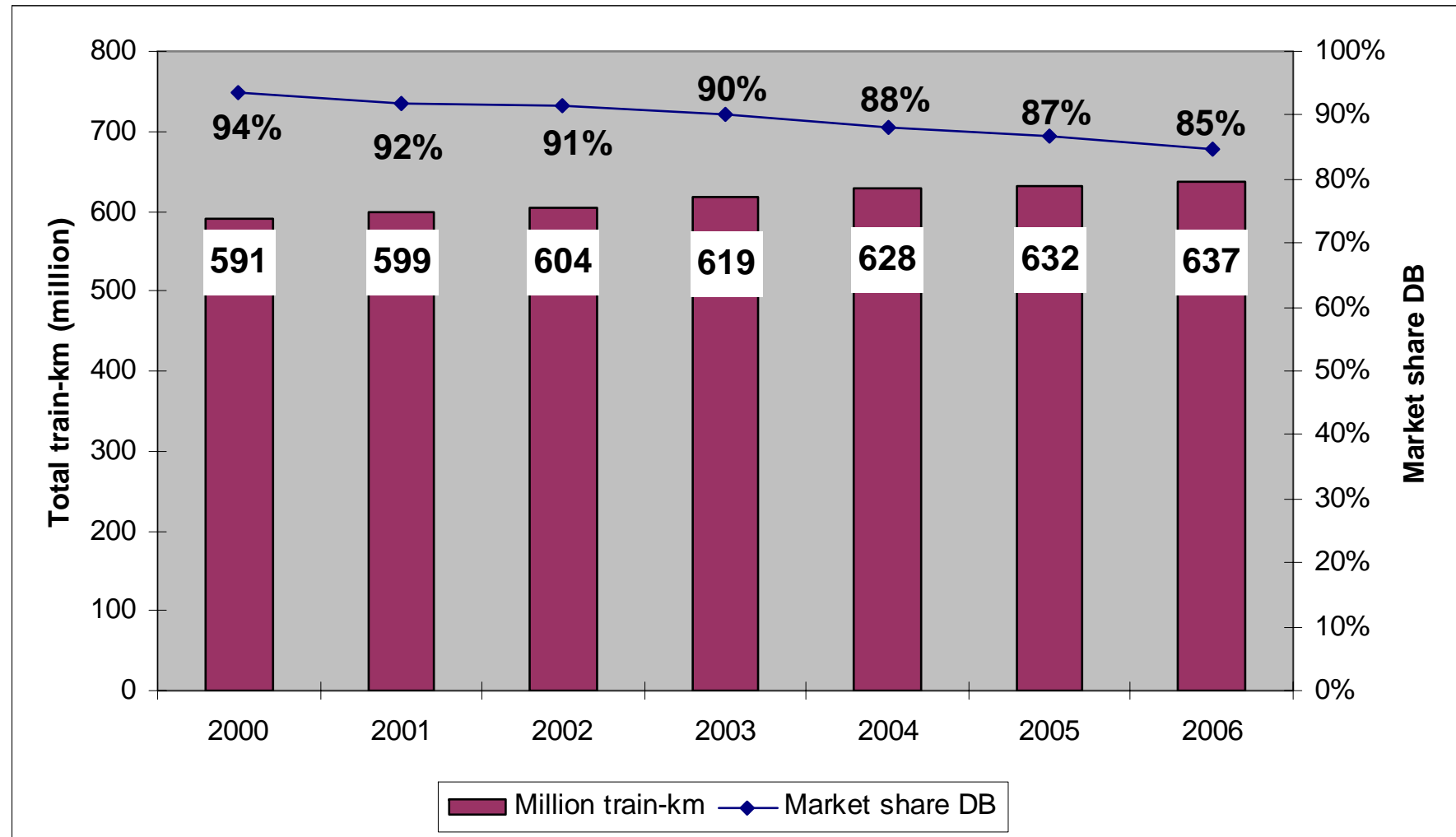
conclusion of contract	train-km (mill.) p.a.	value (billion €)	duration of contract
2002	35.0	1.9	10 years
2003	168.0	17.1	6-13 years
2004	180.8	17.8	10-15 years
2005	25.9	?	5-15 years

Competitive tendering 1996-2006



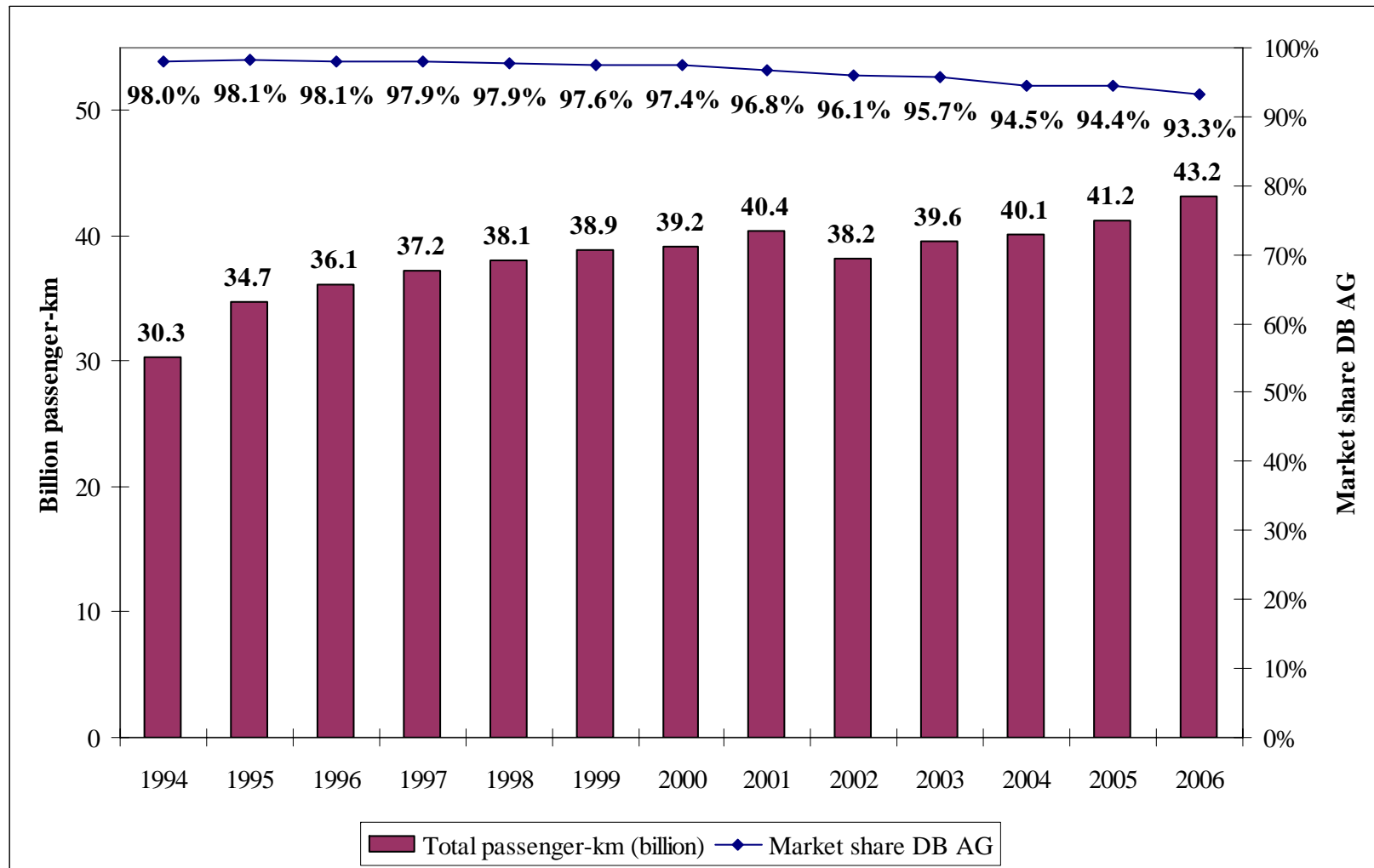
Source: DB AG (2004, 2005, 2006, 2007)

Development of regional rail transport – train km



Source: DB AG (2007)

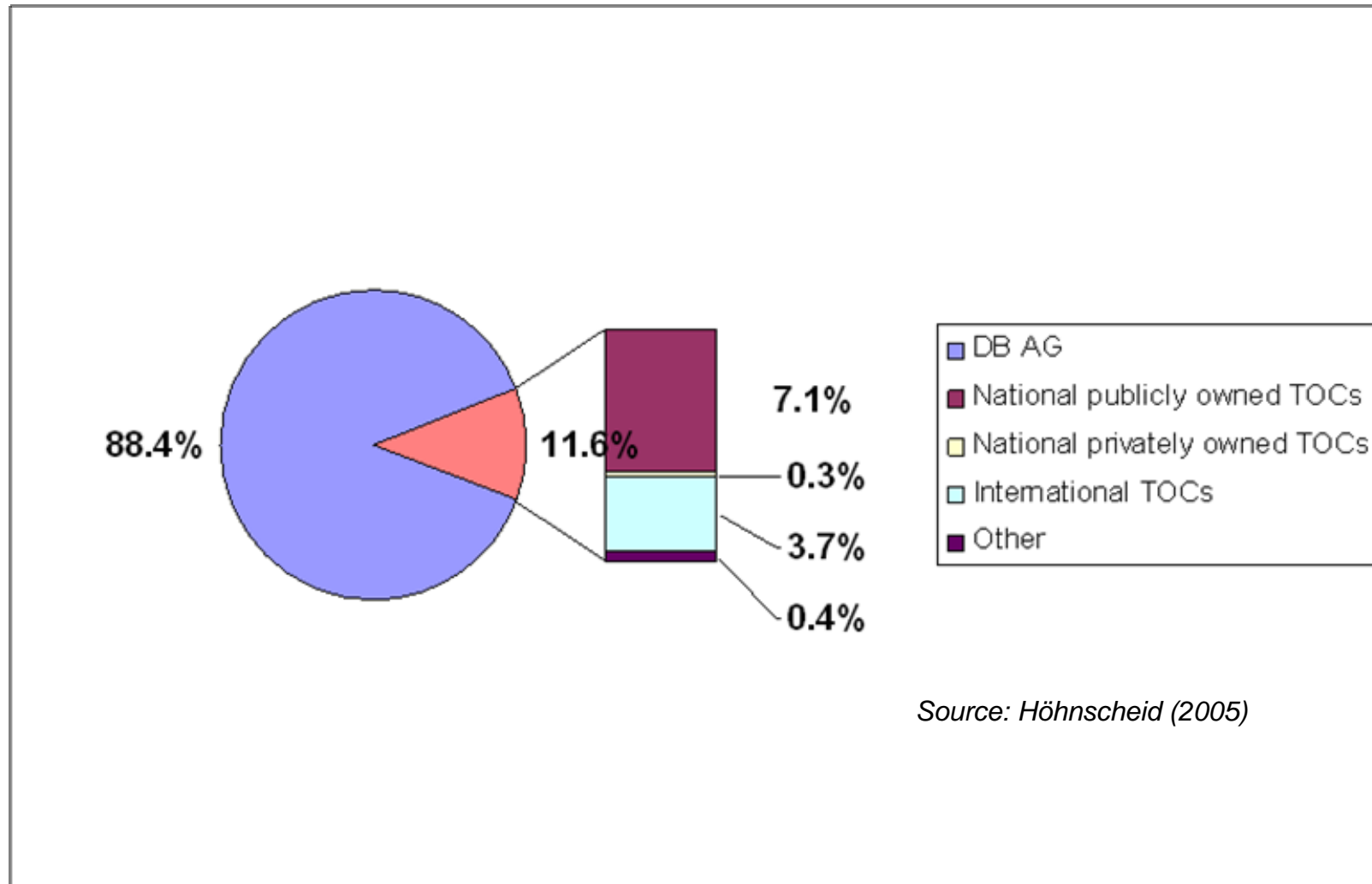
Development of regional rail transport – passenger km



Source: 1994-2002: Prograns (2005); 2003-2006: DB AG (2007); figures for 2006 are estimated by the DB AG

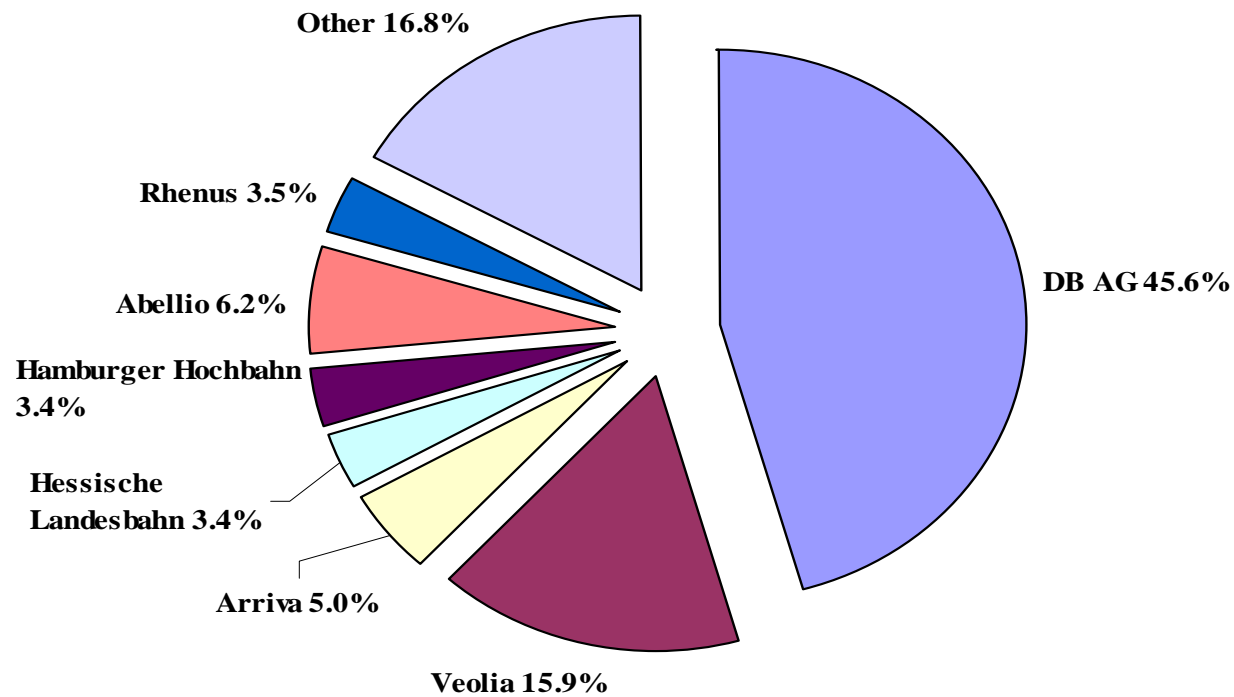
Four different strategic groups of TOCs

(Market share = percentage of train-km)



Source: Höhnscheid (2005)

Share of train-km won by the TOCs in competitive tenders 1996-2006



Source: DB AG (2005, 2007)

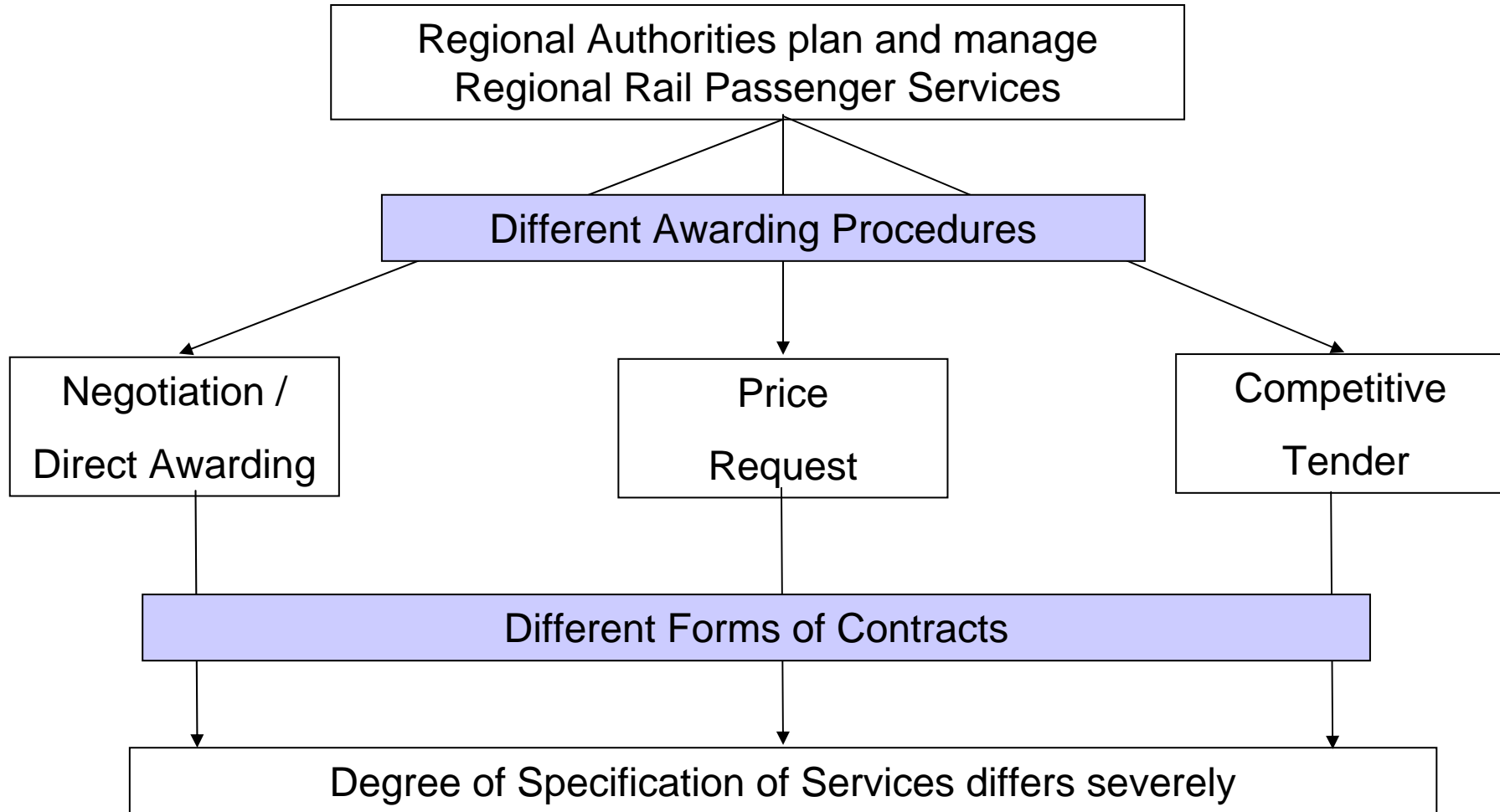
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Different forms of contracts



What kind of contracts were used in tendering?

- **No standardisation of contractual forms**
- **Severe differences concerning**
 - **service specification**
 - **duration and network length**
 - **risk allocation**
 - **additional incentive elements**
 - **contract adjustment**

Contract design (survey results)

Data and Sources

- Own survey (34 questions, 200 attributes)
- Interviews, press releases, www, ...
- Tenders Electronic Daily (EC)
- Tender documents

Treatment of revenue risks

- Net cost contracts (61 %); gross cost contracts (29 %); revenue sharing (10 %)
- Typically, revenue risks are higher than cost risks:
 - limited influence on tariffs
 - uncertainty of prognoses
 - uncertainty about revenue sharing within Integrated Public Transport Systems
 - usually no assured minimum revenue

Treatment of cost risks

- 88 % of all contracts contain pass through-rules for access charges (tracks, stations)
- 80 % of all contracts contain automatic adjustment rules for those cost risks that not covered by pass through-rules; [expenditures for personnel (78 %) and energy (58 %)]
Ca. 50% of these contracts contain threshold values

Additional incentives are provided by bonus malus systems

- 32 % of all contracts contain exclusively malus systems
- 68 % of all contracts contain bonus malus systems

Severe differences in contract duration and network length

Annual Train-km		
Bidding Process	N	49
	Mean	2,3
	Std. Deviation	1,7
	Minimum	0,1
	Maximum	8,7
Negotiation	N	32
	Mean	1,7
	Std. Deviation	1,9
	Minimum	0,1
	Maximum	7,9
Total	N	81
	Mean	2,1
	Std. Deviation	1,8
	Minimum	0,1
	Maximum	8,7

Duration of Contracts		
Bidding Process	N	49
	Mean	10
	Std. Deviation	3
	Minimum	2
	Maximum	15
Negotiation	N	33
	Mean	8
	Std. Deviation	4
	Minimum	2
	Maximum	15
Total	N	82
	Mean	9
	Std. Deviation	4
	Minimum	2
	Maximum	15

Source: Own Questionnaire; N: Number of Observations.

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Contract duration I: OLS regression

LAUFZEIT = Const. + BETRIEBSLEISTUNG + ZEITSPANNE + VVB + FARZ + NACHFRAGE

Specific investment / asset specificity as central determinant of the contract duration (Cf. Newberry / Affuso (2002), Yvrande-Billon (2004))

•**BETRIEBSLEISTUNG: number of annual train-km**

- Determines number of train sets for the particular contract

•**ZEITSPANNE: time lag between publication of the tender and start of the services**

- Measures specific requirements of the rolling stock and/or the number of cars

•**VVB: member of regional transport association**

- Specific investment in ticketing systems and the umbrella brand name

•**FARZ: public support to mitigate asset specificity available**

- Reduction of specific investments by public support for rolling stock

•**NACHFRAGE: information about the demand provided by the *Aufgabentraeger***

- Availability of demand information = measure of uncertainty of environmental factors

Contract duration II: Expected results

$$\text{LAUFZEIT} = \text{Const.} + \text{BETRIEBSLEISTUNG} + \text{ZEITSPANNE} + \text{VVB} + \text{FARZ} + \text{NACHFRAGE}$$

Independent variables and expected signs:

BETRIEBSLEISTUNG: number of annual train-km	+
ZEITSPANNE: time lag between publication of the tender and start of the services [years]	+
VVB: member of regional transport association (Dummy)	+
FARZ: public support to mitigate asset specificity available (Dummy)	-
NACHFRAGE: information about the demand provided by the <i>Aufgabentraeger</i> (Dummy)	?

Contract duration II: Results of the regression

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6,433	0,928		6,935	0,000
BETRIEBSLEISTUNG	0,635	0,350	0,291	1,814	0,079
ZEITSPANNE	1,298	0,493	0,421	2,634	0,013
FARZ	-1,606	0,731	-0,285	-2,197	0,035
R	0,705				
R Square	0,496				
Adjusted R Square	0,451				
Std. Error of the Estimate	2,076				
Durbin-Watson	2,225				

Dependent Variable: Laufzeit

Correlations

		1.	2.	3.	4.	5.	6.	7.
1. LAUFZEIT	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	81						
2. VOLLST	Pearson Correlation	0,233	1					
	Sig. (2-tailed)	0,052						
	N	70	70					
3. BETRIEBSLEISTUNG	Pearson Correlation	,431(**)	0,013	1				
	Sig. (2-tailed)	0,000	0,913					
	N	80	69	80				
4. ZEITSPANNE	Pearson Correlation	,537(**)	0,278(*)	0,412(**)	1			
	Sig. (2-tailed)	0,000	0,022	0,000				
	N	79	68	78	79			
5. VVB-	Pearson Correlation	0,051	0,524(**)	-0,254	-0,070	1		
	Sig. (2-tailed)	0,752	,000	,110	0,661			
	N	41	41	41	41	41		
6. FARZ	Pearson Correlation	-0,298	-0,495(**)	0,147	-0,132	-0,101	1	
	Sig. (2-tailed)	0,073	0,002	0,386	0,436	0,551		
	N	37	37	37	37	37	37	
7. NACHFRAGE	Pearson Correlation	0,320(*)	0,506(**)	-0,039	0,061	0,108	-0,691(**)	1
	Sig. (2-tailed)	0,050	0,001	0,816	0,715	0,518	0,000	
	N	38	38	38	38	38	35	38

** Correlation is significant at the 0.01 level (2-tailed).
 * Correlation is significant at the 0.05 level (2-tailed).

Conclusion

- **Regionalisation: Success story in terms of performance, but paid by a rise of public funds**
- **Variety of awarding procedures and contract designs**
- **Still a high share of gross cost contracts**
- **Additional incentives by partly very complex bonus malus schemes**
- **Contract duration is aligned to the degree of specific investments**

Outlook

Regional Authorities expect/want ...

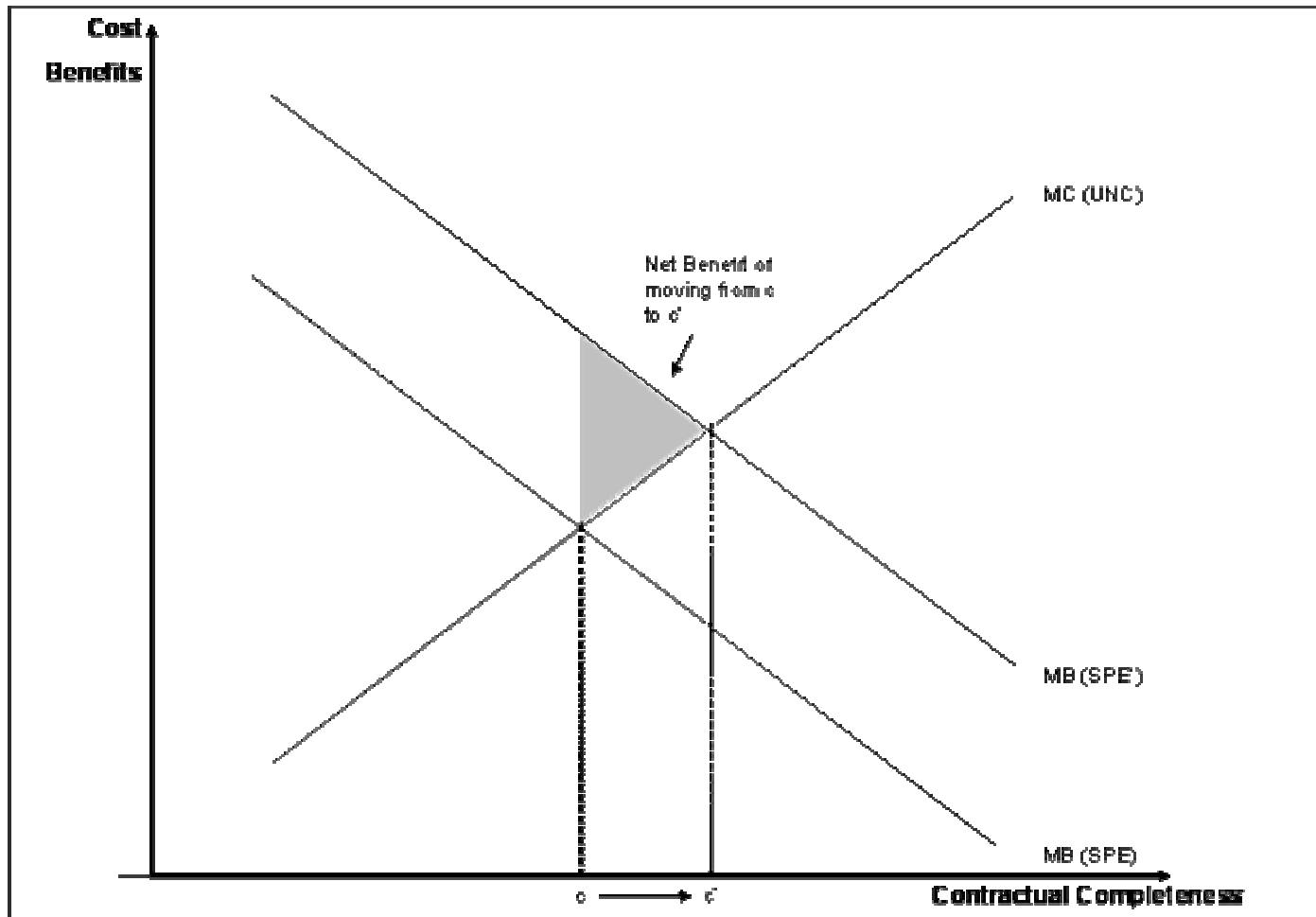
- **Contract duration: 10 + x, hold-up problems to cease with developing leasing markets for rolling stock**
- **Network length: 5.0 mill train-km p.a.**
- **Functional service specification**
- **Risk allocation: Net cost contracts**
- **Bonus-Malus contracts (quality broadly defined)**
- **Contract adjustment: automatic adjustment clauses and formal adjustment processes**

...BUT

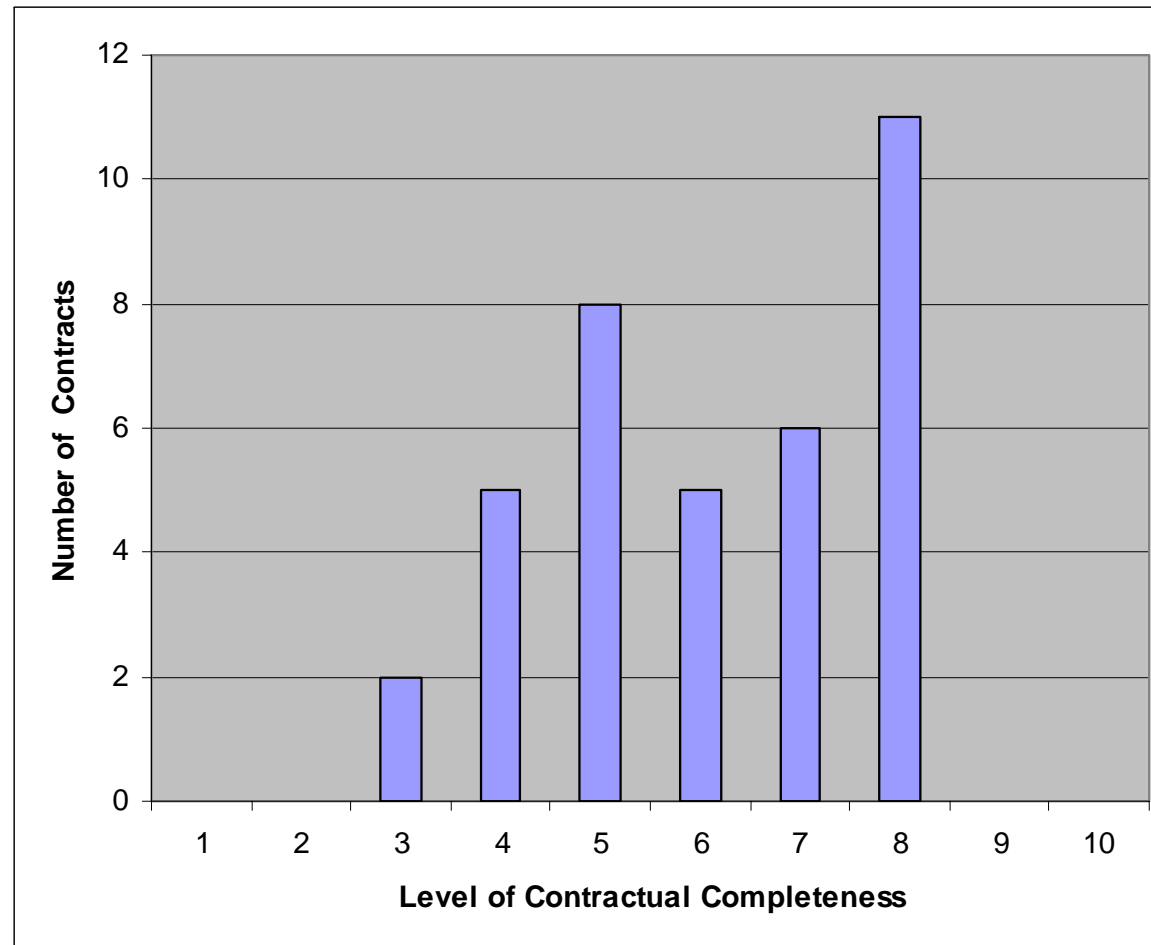
- **Future development is highly uncertain**
 - **availability of funds**
 - **use of tenders vs. direct awarding**

Thank You!

Completeness of Contracts I



Completeness of contracts II: Number of observations per level of contractual completeness



Source: Own figure

Contractual Completeness: Logit estimation

$$\text{VOLLST} = \text{Const.} + \text{BETRIEBSLEISTUNG} + \text{ZEITSPANNE} + \text{VVB} + \text{NACHFRAGE}$$

Independent variables and expected signs:

BETRIEBSLEISTUNG: number of annual train-km	+
ZEITSPANNE: time lag between publication of the tender and start of the services [years]	+
VVB: member of regional transport association (Dummy)	+
NACHFRAGE: information about the demand provided by the <i>Aufgabentraeger</i> (Dummy)	+

Contractual Completeness: Results

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	119,751			
Final	74,607	45,144	3	,000
Cox and Snell	0,705			
Nagelkerke	0,730			
McFadden	0,362			

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[VOLLST = 3]	-10,217	1,968	26,962	1	0,000	-14,073	-6,360
	[VOLLST = 4]	-7,901	1,663	22,581	1	0,000	-11,159	-4,642
	[VOLLST = 6]	-5,367	1,414	14,404	1	0,000	-8,139	-2,596
	[VOLLST = 7]	-3,625	1,139	10,134	1	0,001	-5,857	-1,393
	[VOLLST = 8]	-2,092	0,971	4,646	1	0,031	-3,995	-0,190
Location	ZEITSPANNE	-1,051	0,416	6,369	1	0,012	-1,867	-0,235
	[VVB = 0]	-5,388	1,283	17,634	1	0,000	-7,903	-2,873
	[VVB = 1]	0(a)	.	.	0	.	.	.
	[NACHFRAGE = 0]	-4,840	1,194	16,438	1	0,000	-7,180	-2,500
	[Nachfrage = 1]	0(a)	.	.	0	.	.	.

Tendencies (especially 1998-2003)

- **Contract duration: on average 8-9 years**
- **Network length: 1.0 – 3.5 mill train-km p.a.**
- **Tight service specification concerning timetables and rolling stock**
Partly: Obligatory use of rolling stock pools and maintenance
- **Risk allocation:**
 - **Revenue risk with TOC, Regional Authority or shared**
 - **Cost risk with TOC**
but: cost pass-through rules (track / station access charges)
- **Bonus-Malus contracts (mainly malus, mainly punctuality)**
- **Contract adjustment: automatic adjustment clauses and formal adjustment processes**