State of the Railway World

Louis S. Thompson
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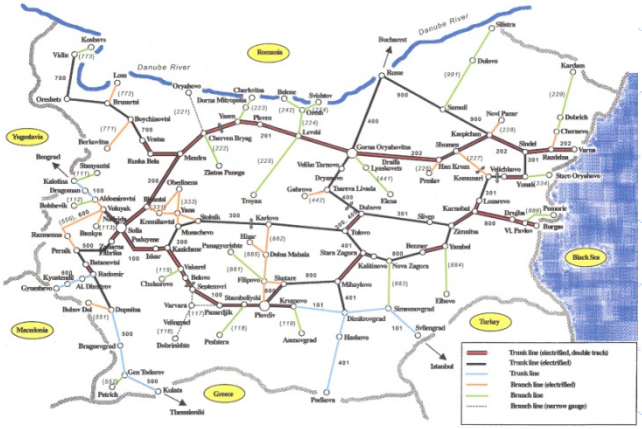
The World Bank



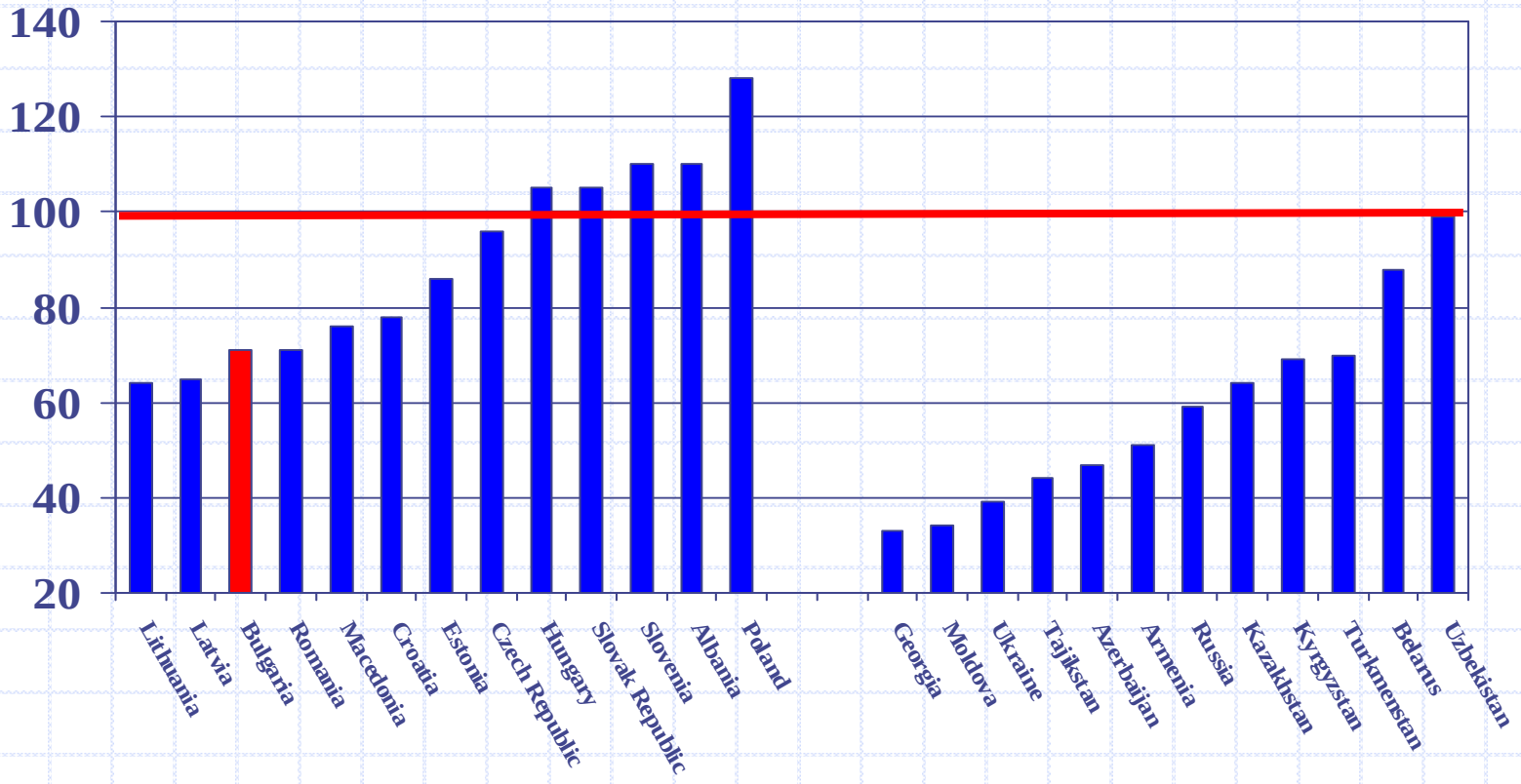
June 2002

Rail reform is happening everywhere (not just Bulgaria)

- Railway deficits unaffordable
- Regional pressures (especially E.U. policy)
- Globalization drives out inefficiency
- Failure and collapse are possible
- The experience of the former socialist countries – especially E.U. accession candidates
- Paradigm Change: what do we need railways for? What does Bulgaria need rail service for?

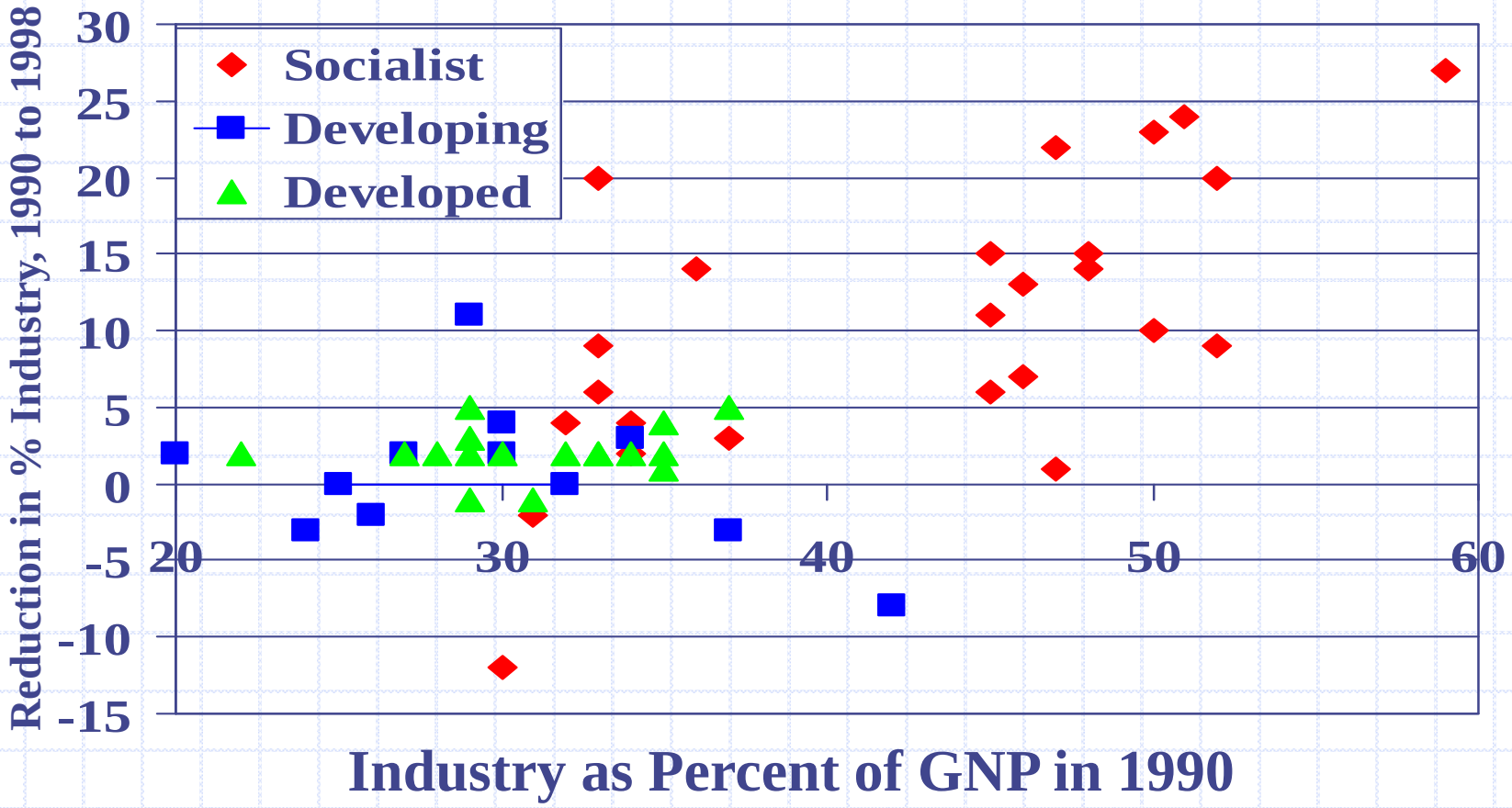
The transition is still underway

GDP: 2000 vs. 1988 (%)



The shift in economic structure

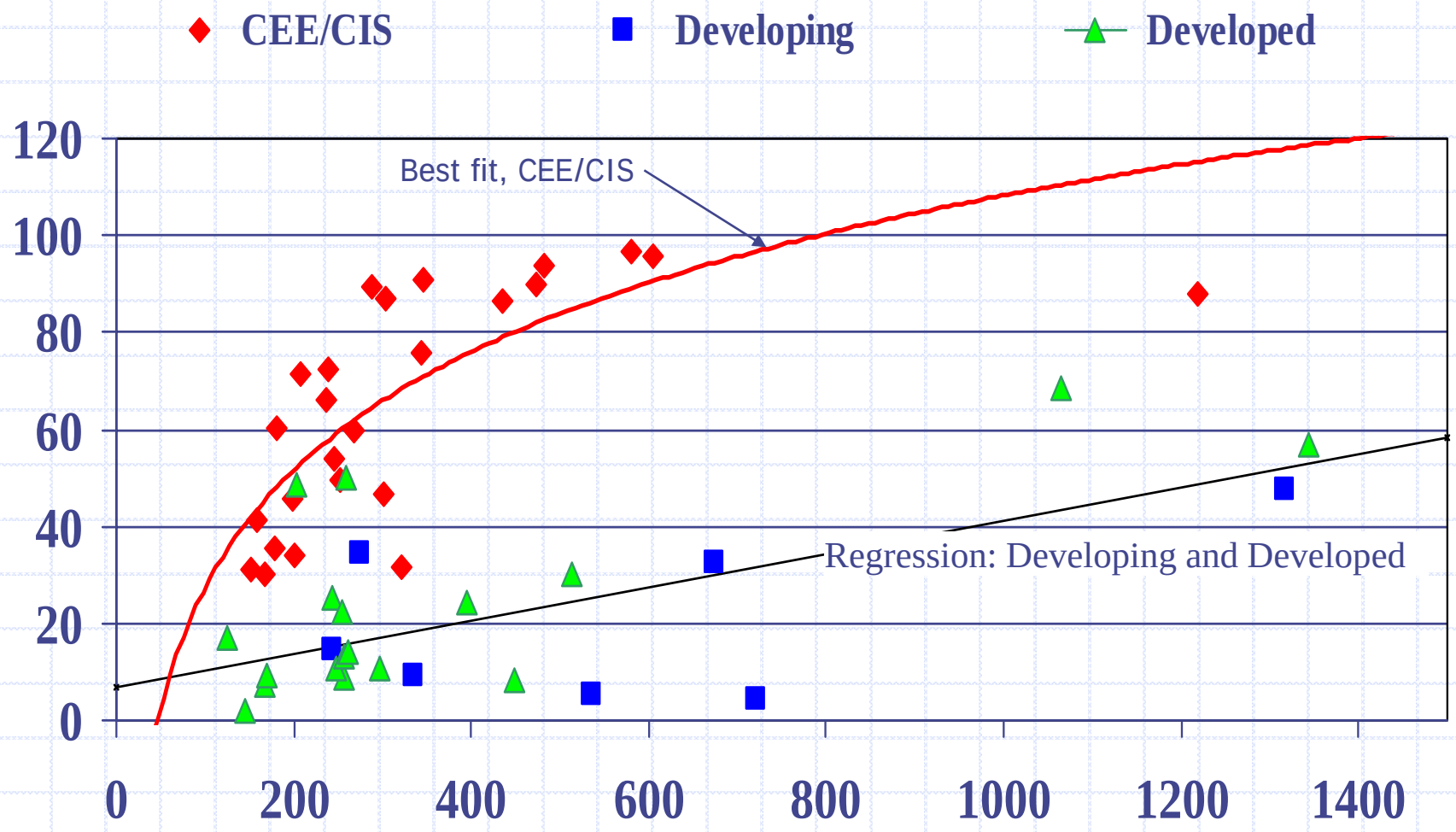
(Industry as Percent of GNP: Change 1990 to 1998 versus percentage in 1990)



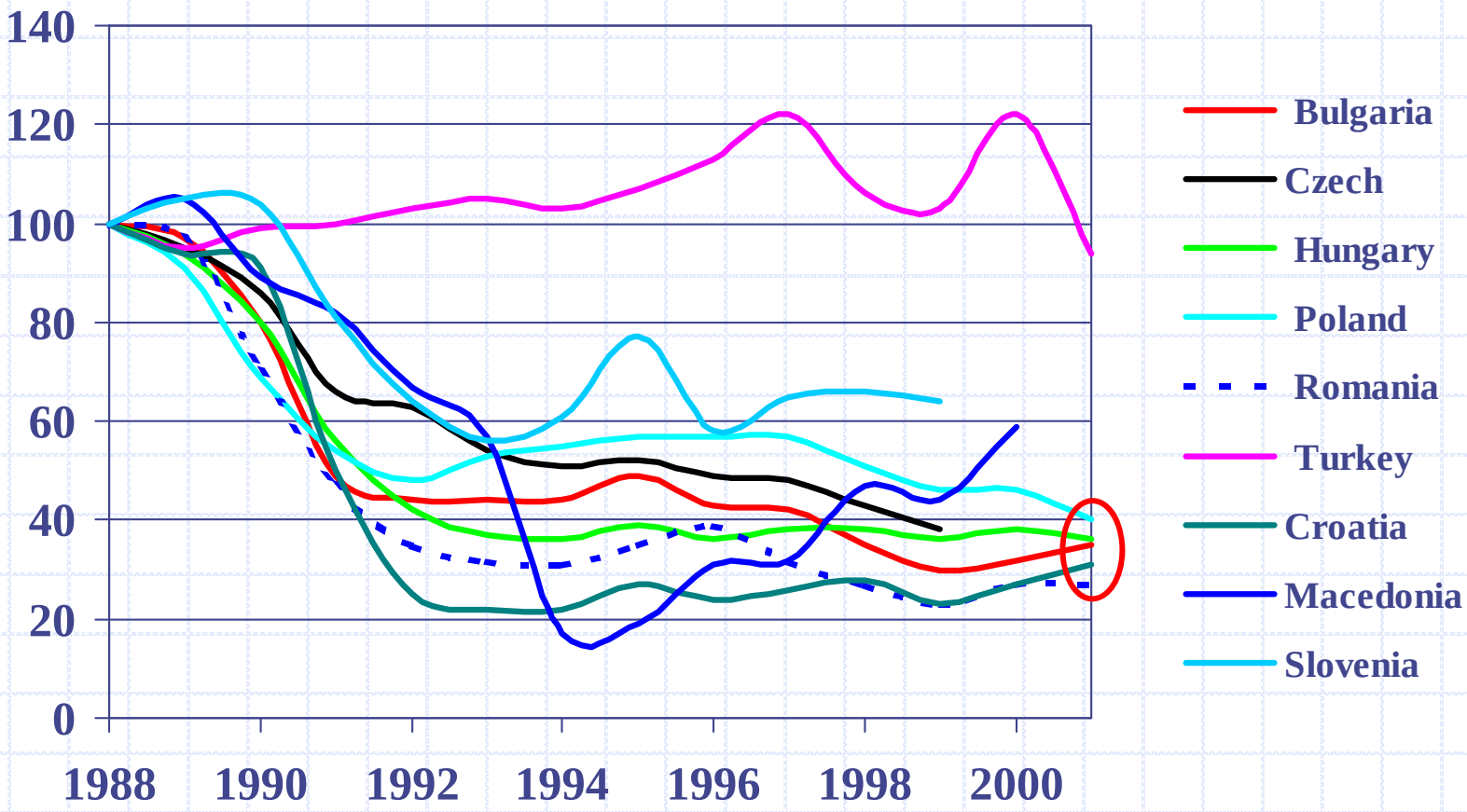
Conclusion: socialist countries had the highest percent of GNP as industry in 1990, and they showed the highest reduction in industry percentage between 1990 and 1998

Rail Share in Transition countries is still unusually high

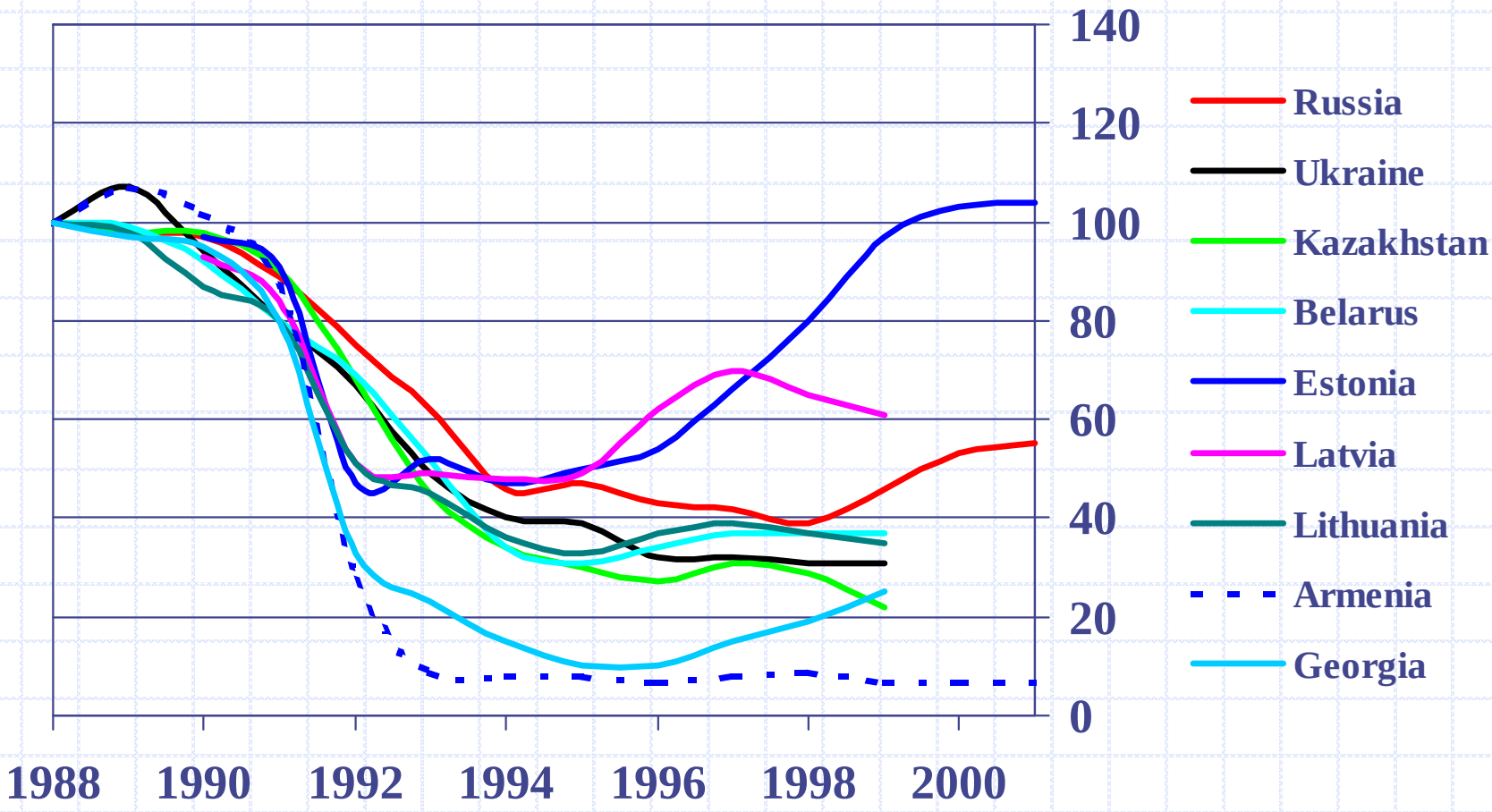
(Rail Share of Rail + Truck Traffic (%) versus Average Rail Length of Haul 1998)



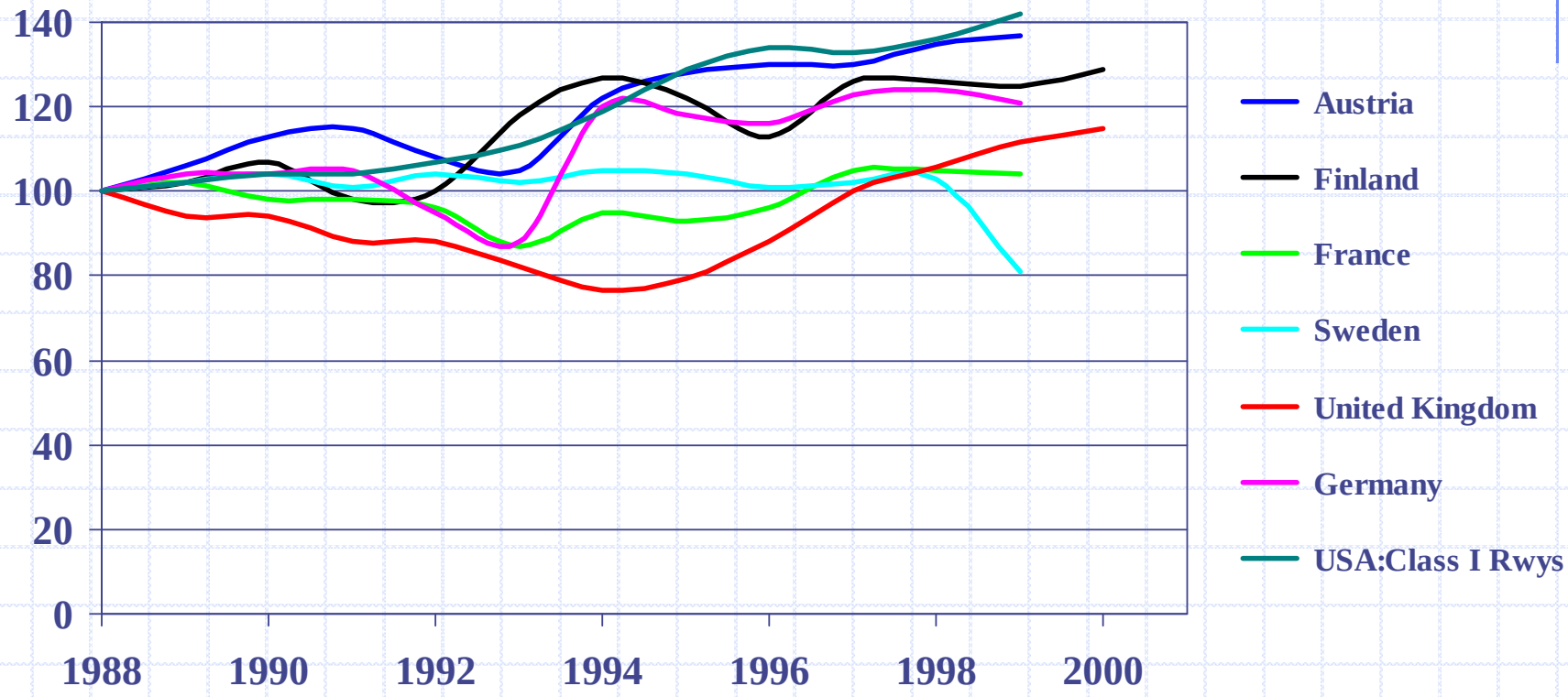
Ton-Km trends by CEE railways and Turkey



Ton-Km trends by CIS railways

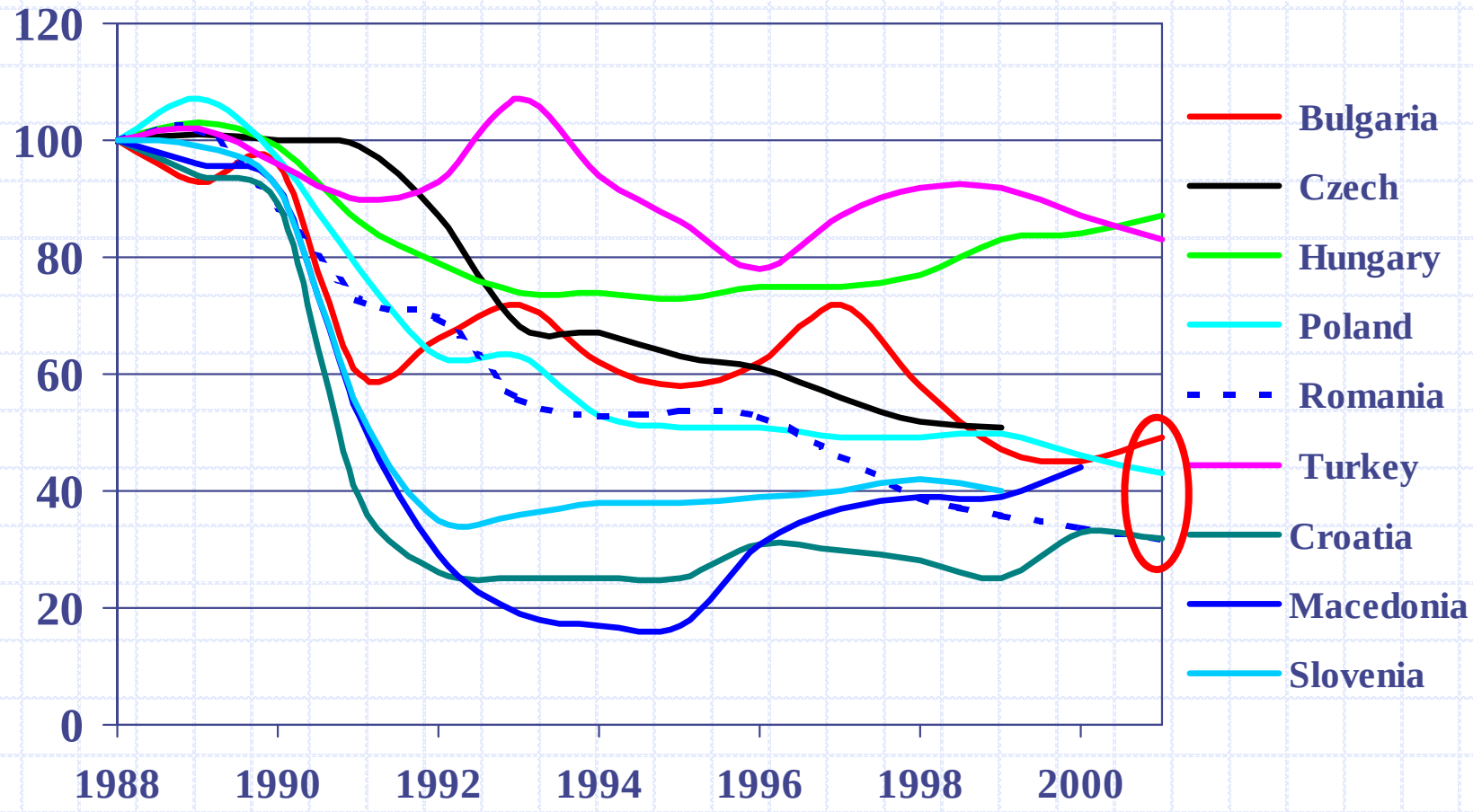


Ton-Km trends by Western railways

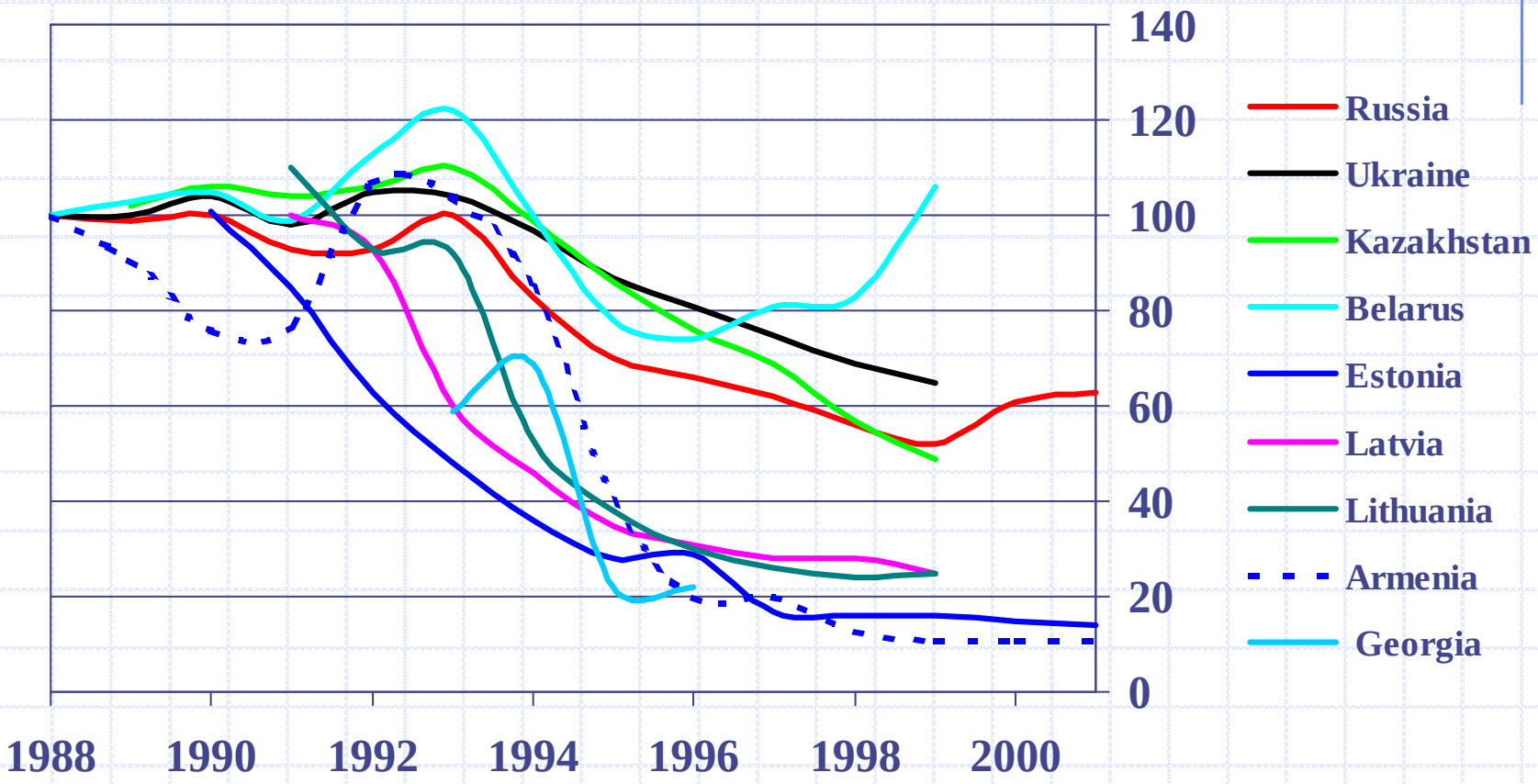


Note: Germany after 1993 includes DR traffic

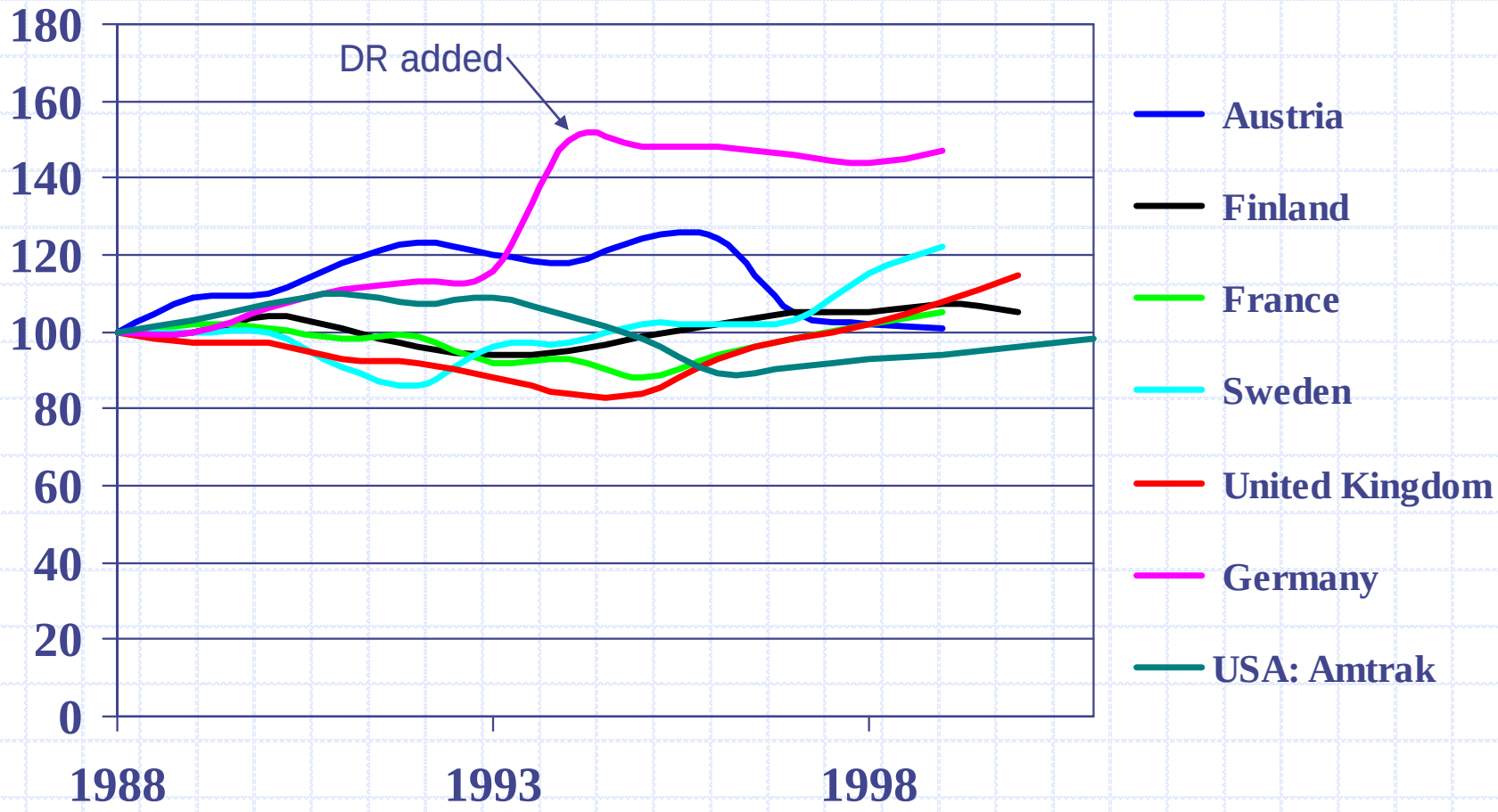
Passenger-Km trends by CEE railways and Turkey



Passenger-Km trends by CIS railways



Passenger-Km trends by Western railways

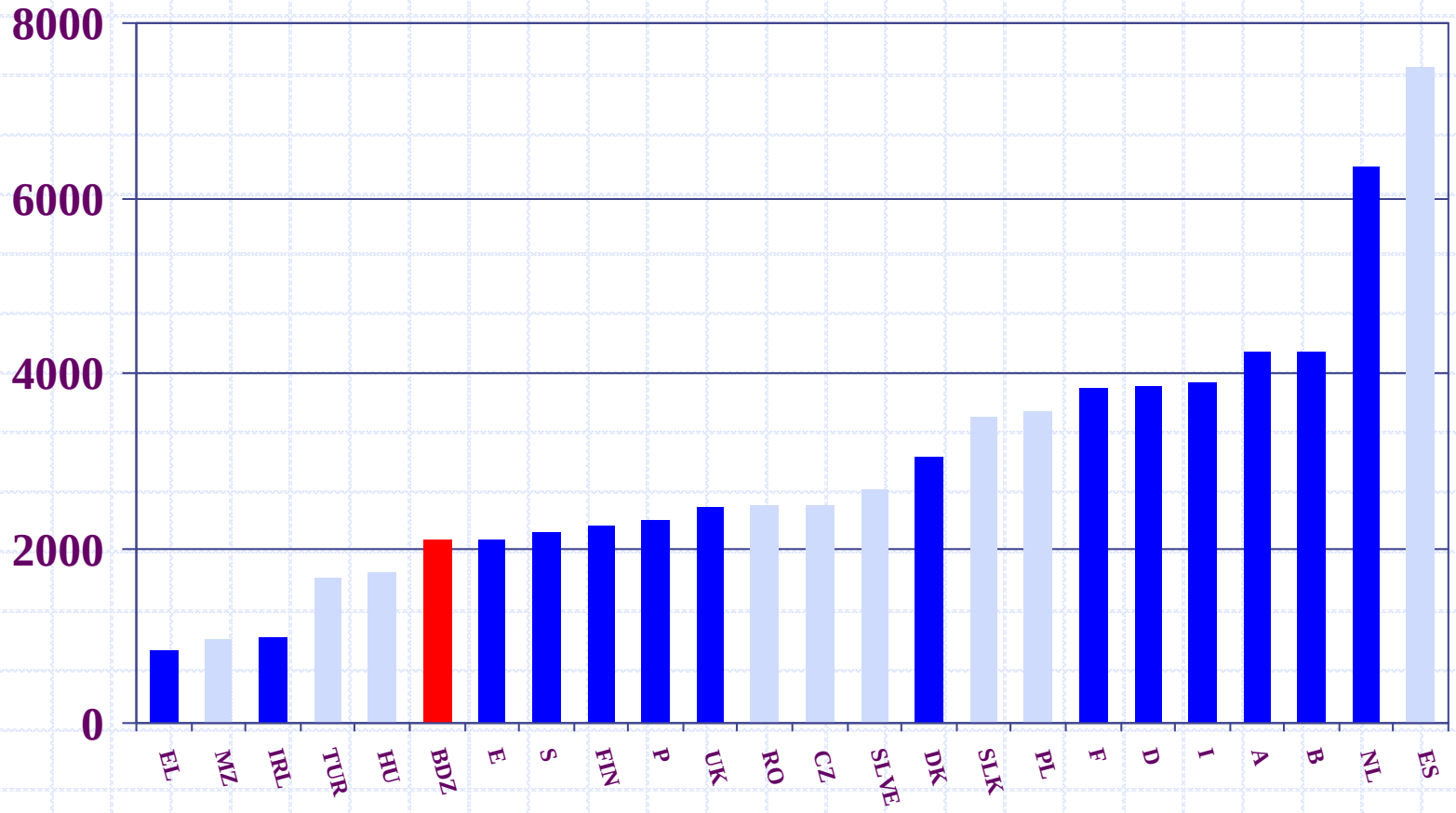


The Bulgarian context

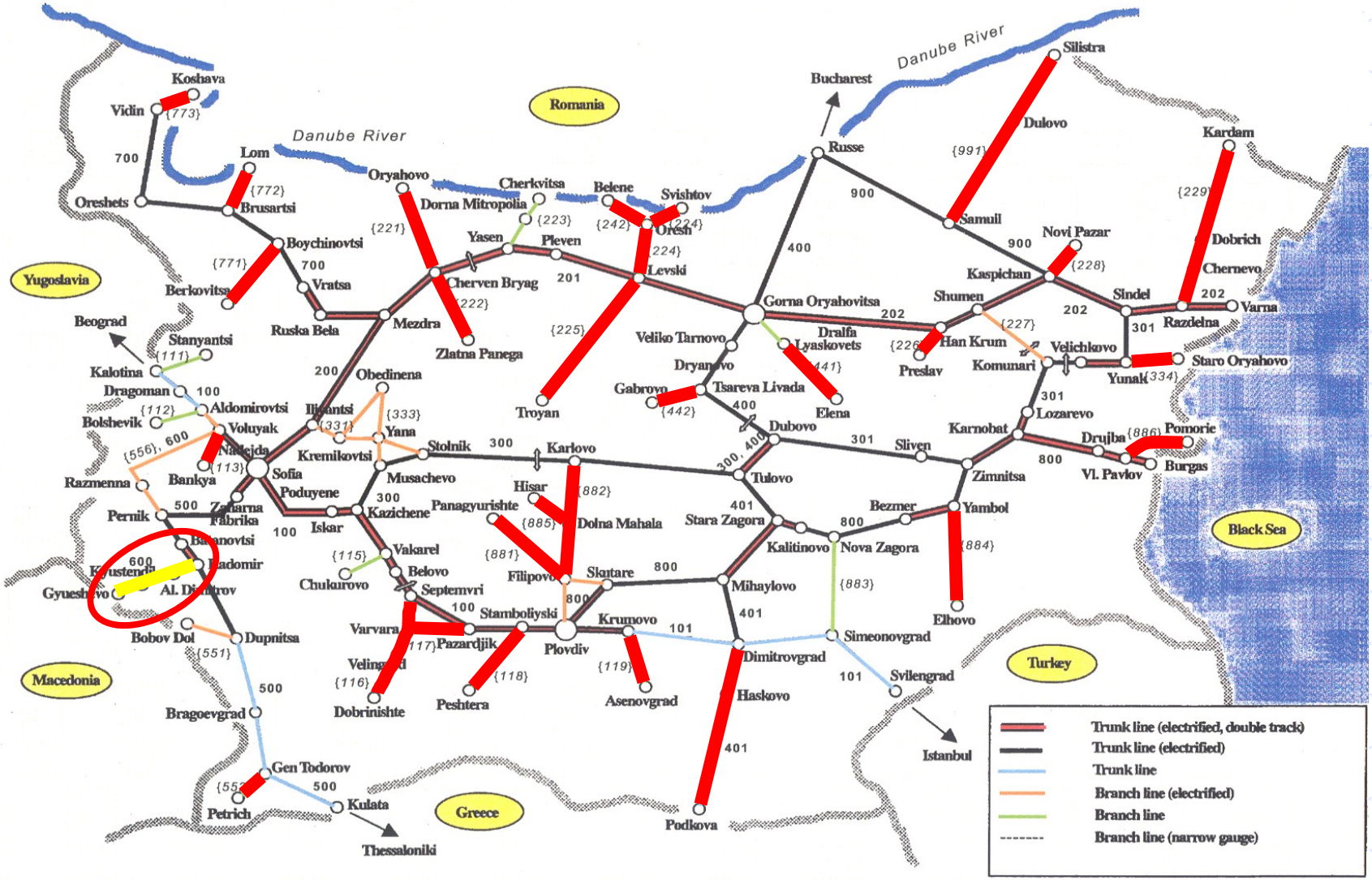
- Relatively low traffic density
- Relatively low labor productivity
- Serious cross subsidy between freight and passenger services – a real problem for both passenger and freight

BDZ's average traffic density is low

(T-km+P-Km)/Km



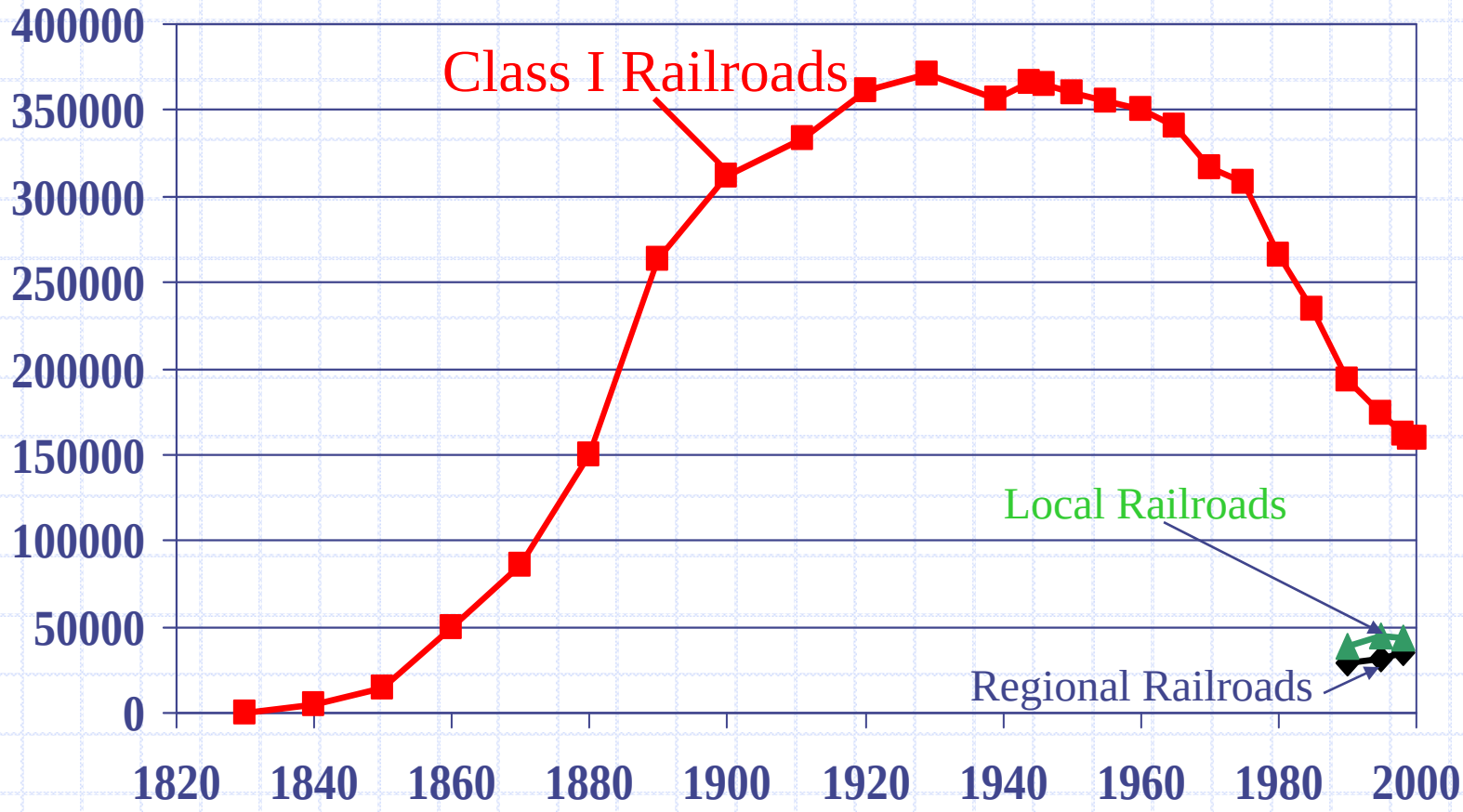
As a result: 30 percent of the RI NC network's lines may be uneconomic



Source: "Padeco Report", March 2001, page 17

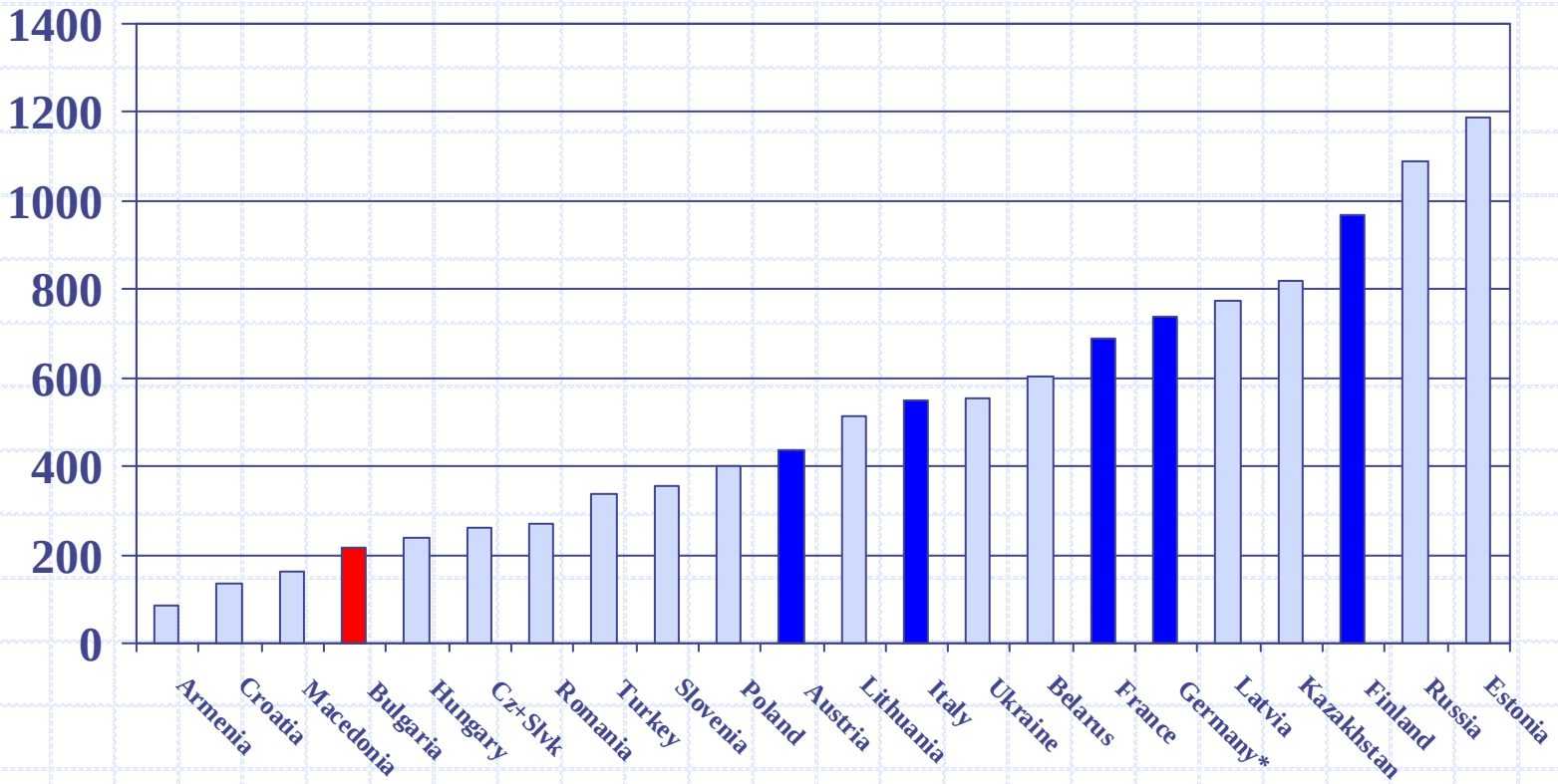
Rail system shrinkage is not unusual

(Km of Rail Line in the US)



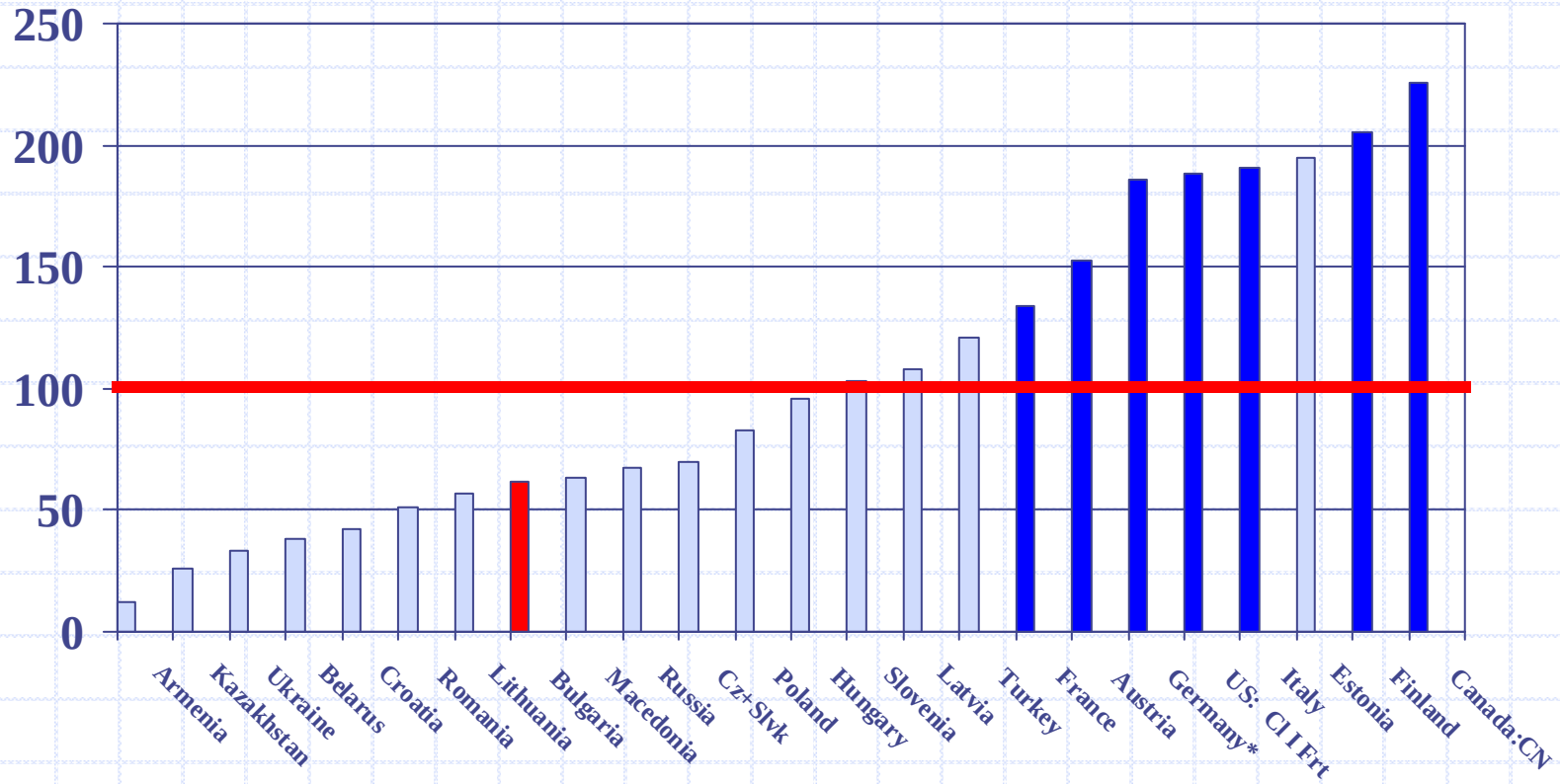
In Turkey, a core network (52%) carried more than 80 percent of both freight and passenger traffic in 2000

BDZ labor productivity is low



And labor productivity in BDZ has fallen farther than most other railways

(Ratio of labor productivity in 1999 to 1988)



Below red line, productivity is actually worse in 1999 than in 1988

Note: transition economies are the poorest performers

BDZ Compared with the Freight Concessions

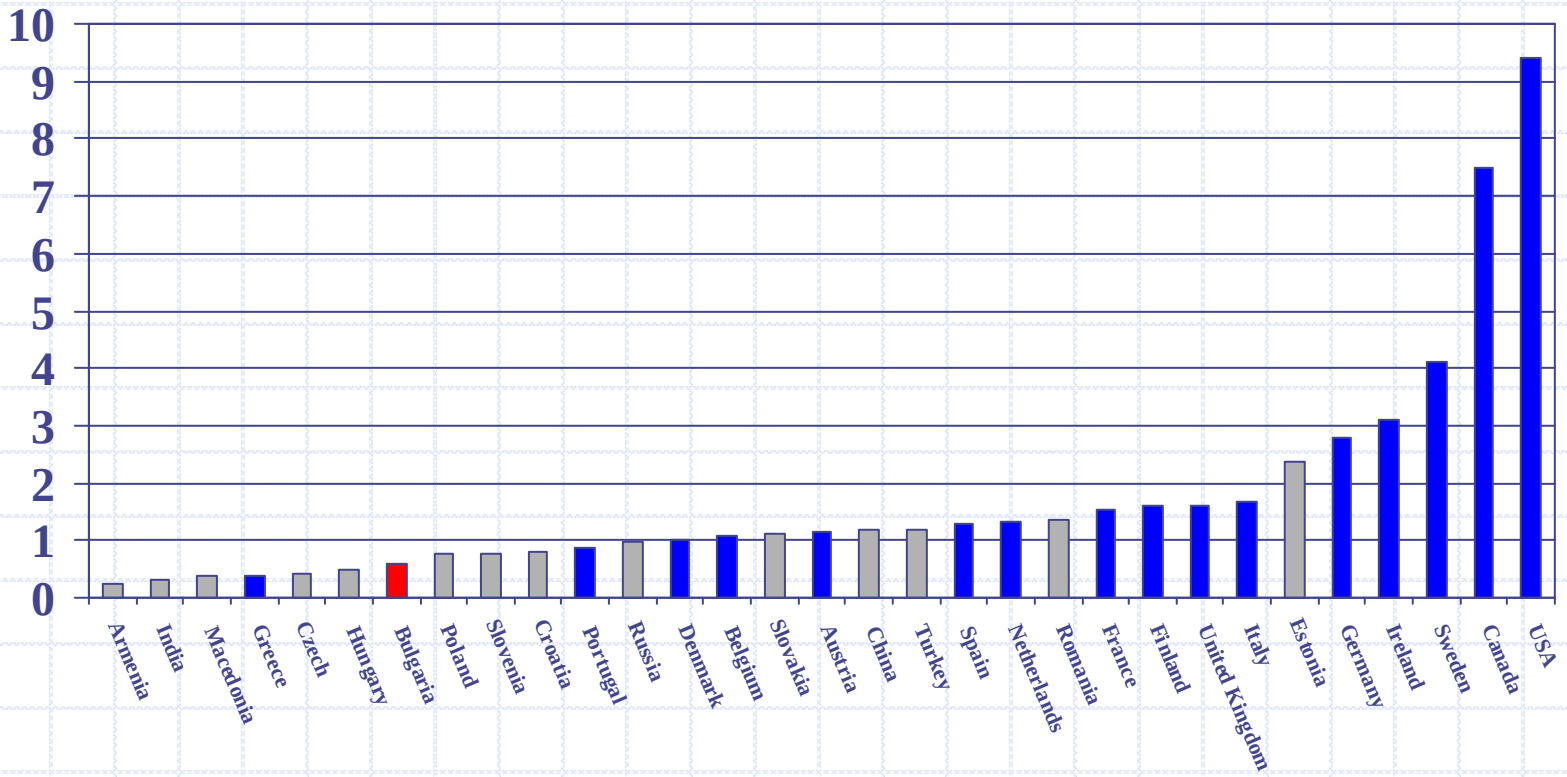
	Year	Km of line	Ton-Km (000,000)	Pass-Km (000,000)	Employees	TU/ Employee (000)	TU/Km (000)
Argentina							
Ferroespresso Pampeano	2000	5,094	877		810	1.08	172
Nuevo Central Argentino	2000	4,512	2,490		1,311	1.90	552
Ferrosur Roca	2000	3,342	1,263		772	1.64	378
Buenos Aires al Pacifico	2000	5,252	2,268		914	2.48	432
Ferrocarril Mesopotamico -- FMGU	2000	2,739	495		339	1.46	181
Bolivia							
Empresa Ferroviaria Oriental	2000	1,244	626	192	461	1.77	658
Empresa Ferroviaria Andina	2000	1,499	557	72	324	1.94	420
Brazil							
Ferrovia Centro-Atlântica S.A.	2000	7,263	7,268		2,596	2.80	1,001
Ferrovia Novoeste S.A.	2000	1,621	1,588		639	2.49	980
Companhia Ferroviária do Nordeste	2000	4,381	709		694	1.02	162
MRS Logística S.A.	2000	1,675	26,837		2,988	8.98	16,022
América Latina Logística	2000	6,355	10,285		2,018	5.10	1,618
Ferrovia Tereza Cristina S.A.	2000	174	259		142	1.82	1,489
Ferrovias Bandeirantes S.A.	2000	4,236	5,984		3,174	1.89	1,413
Chile							
FEPASA	2000	2,379	1,189		521	2.28	500
Ferronor	2000	2,229	743		360	2.06	333
Ferrocarril Arica-La Paz	2000	206	59		95	0.62	286
Mexico							
TFM	1999	5,176	17,256		3,694	4.67	3,334
Ferromex	1999	10,724	20,638	80	8,666	2.39	1,932
Sureste	1999	1,479	4,734		2,097	2.26	3,201
FCCM	2000	1,869	1,017		352	2.89	544
Cote d'Ivoire/Burkina Faso -- SITARAIL	2000	639	523	126	1,673	0.39	1,016
New Zealand -- Tranzrail	2000	3,904	4,078	*470*	4,064	1.12	1,165
Bulgaria	2000	4,290	5,538	3,472	40,000	0.23	2,100

BDZ Compared with the Passenger Concessions/Franchises

	Year	Km of line	Ton-Km (000,000)	Pass-Km (000,000)	Employees	TU/ Employee (000)	TU/Km (000)
Argentina							
Ferrovias	2000	54		617	615	1.00	11,363
Transmet -- San Martin	2000	56		1,152	656	1.76	20,571
Transmet -- Belgrano Sur	2000	66		312	657	0.47	4,727
Transmet -- Roca	2000	261		2,472	2,227	1.11	9,471
TBA -- Mitre	2000	186		1,456	1,648	0.88	7,828
TBA -- Sarmiento	2000	184		2,619	1,398	1.87	14,234
Metrovias -- Urquiza	2000	32		434	*440*	0.99	13,563
Metrovias -- Subte (Metro)	2000	47		1,124	*2,056*	0.55	23,915
Brazil							
Supervia	2000	200		2,247	2,236	1.00	11,235
Rio Metro	2000	35		*487*	1,534	0.32	13,914
Bulgaria	2000	4,290	5,538	3,472	40,000	0.23	2,100
U.K.							
UK system	2000	26,605	19,500	39,010	52,000	1.13	2,199
UK WCML (employment est.)	2000	2,775	1,600	3,362	4,880	1.02	1,789

The cross-subsidy issue: BDZ EAD's passenger tariffs are too low

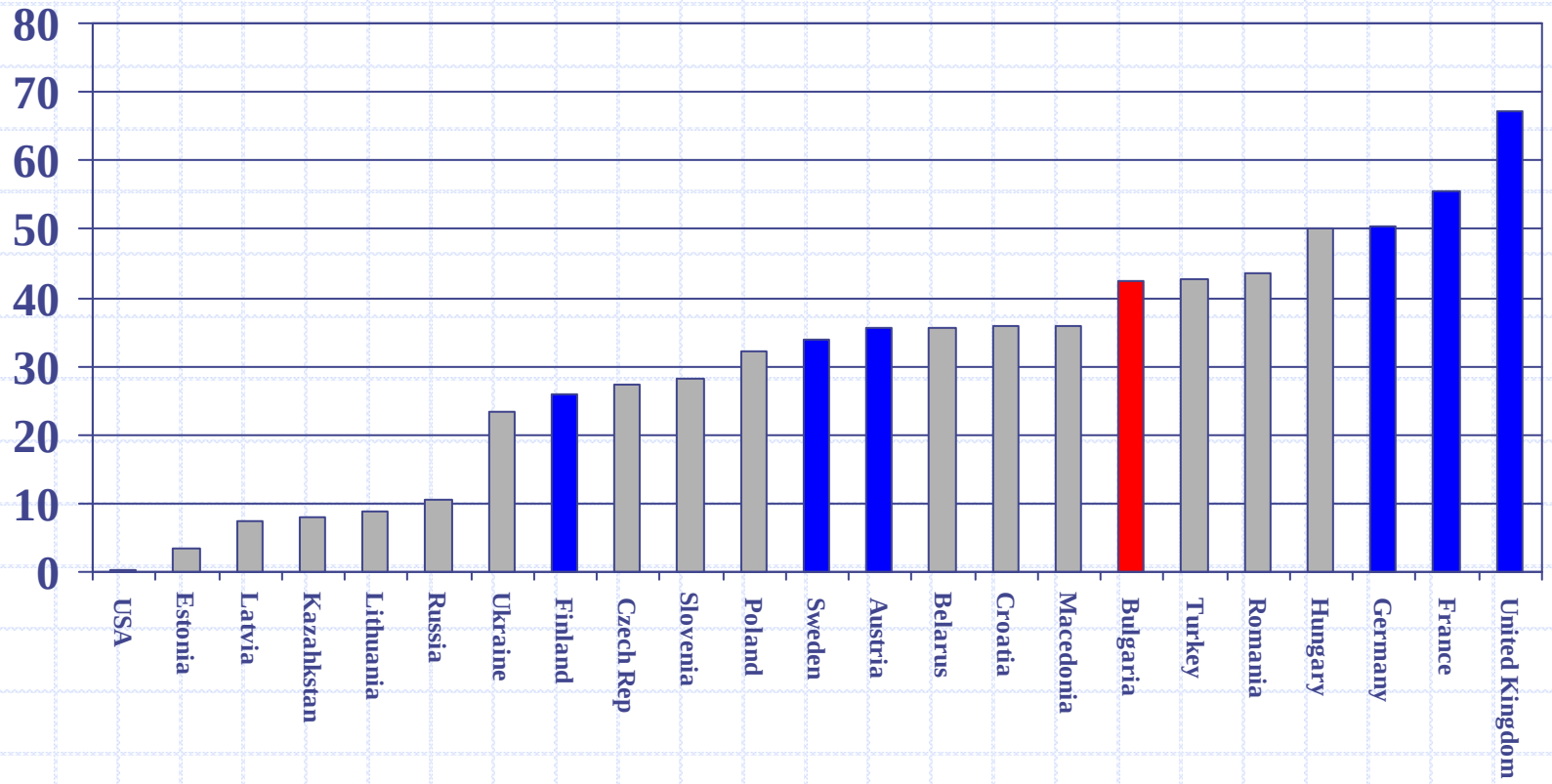
(Ratio of average passenger fare to average freight tariff)*



*(Passenger revenue/passenger-km)/(freight revenue/ton-km)

Ratios of passenger to total traffic: BDZ EAD's share of passenger traffic is relatively high

(p-km/(p-km+t-km) in %)



BUT, freight trains pay 20 to 40 times as much as passenger trains pay for access fees – hidden X sub.

Padeco: RI NC's infrastructure access charges

	Freight		Passenger		Ratio: Freight to Passenger	
Reservation of Capacity	**Train-Km**	**GT-Km**	**Train Km**	**GT-Km**	**Train Km**	**GT-Km**
Electrified	1.86856	0	0.05414	0	34.5	HIGH
Non-Electrified	1.63675	0	0.05414	0	30.2	HIGH
Passage on Main Lines						
Electrified	4.76881	0.00536	0.19591	0.00026	24.3	20.6
Non-Electrified	3.29168	0.00536	0.12823	0.00026	25.7	20.6
Passage on Secondary Lines						
Electrified	8.43254	0.01512	0.3116	0.0005	27.1	30.2
Non-Electrified	5.58418	0.01512	0.1991	0.0005	28.0	30.2

Source: "Padeco Study", March 2002, page 40

The hidden Cross Subsidy

Note: passenger gross ton-km is 47 percent of total gross ton-km, but passenger services pay only 8 million leva while freight pays 142 million leva, or 5.3%

RI NC's infrastructure access charges published S.G. 1 / 04, January, 01.2002

On the Main Railway		Passenger	Freight	Ratio: Freight to Passenger	Converted Ratio*: Freight to Passenger
For the railway	Lv/Gross ton-km	0.000260	0.005360	20.6	20.6
For the electric installation	Lv/train-km	0.040620	0.757320	18.6	7.4
For contact network	Lv/train-km	0.027060	0.719810	26.6	10.5
For travelling management	Lv/train-km	0.128230	3.291680	25.7	10.2
On Second Class Railway					
For the railway	Lv/Gross ton-km	0.000500	0.015120	30.2	30.2
For the electric installation	Lv/train-km	0.066372	1.163810	17.5	7.0
For contact network	Lv/train-km	0.048780	1.674550	34.3	13.6
For travelling management	Lv/train-km	0.199100	5.594180	28.1	11.1
On Medium Network					
For the railway	Lv/Gross ton-km	0.000270	0.005740	21.3	21.3
For the electric installation	Lv/train-km	0.043180	0.784780	18.2	7.2
For contact network	Lv/train-km	0.027770	0.737900	26.6	10.5
For travelling management	Lv/train-km	0.136090	3.447220	25.3	10.0

* Uses 797 gross ton-km/train-km for freight and 316 gross ton-km/train-km for passenger

Services, structure and competition

- Intercity, Suburban/Regional and Freight are different markets, need focused management
- Get rid of non-core
- Organization options emerging:
  - Monolithic (the old, existing)
  - Dominant operator controls infrastructure, incremental user pays for access
  - Infrastructure separation: all users pay for access
- Ownership – can be public, private, or partnerships

Structure and ownership interactions

Ownership

Structure

	Public Ownership			Partnerships: Operating Concessions or Franchises			Private Owne
	Infrastructure	**Passenger Services**	**Freight Services**	**Infrastructure**	**Passenger Services**	**Freight Services**	**Infrastructure**
Integral/Monolith	Belarus, Russia (2000)	Belarus	Belarus	Argentina, Brazil, Mexico	Argentina, Brazil	Argentina, Brazil, Mexico	New Zealand
Integral, with accounting separation	China, EU 91/440	China, EU 91/440	China, EU 91/440	Poland (LHS)		Poland (LHS)	
Dominant integral with separated minority operators and accounting separation	Kazakhstan, India	India, China, Amtrak, VIA, Chile (Merval), Brazil (CPTM)	India, China	Brazil (Band.)		Chile, Brazil (Band.)	US, Canada, Japan
Separated infrastructure	Poland, Slovenia, EU (2001/12), Russia, Bulgaria, Sweden, Germany	Sweden, Germany, Bulgaria, Macedonia	Sweden, Germany, Bulgaria, Macedonia	Estonia	Sweden, Poland (SKM/WKD), Romania	Estonia, Russia	UK

No single solution, mixtures possible, not static

The Commission Orders require

- Infrastructure separation
  - accounting, but headed for institutional
  - access fee non-discriminatory, recommend “social marginal cost pricing”
- Subsidized operating services must be by PSO contract and moving toward requiring contracts to be competed
- Since freight and intercity passenger services may not be subsidized, strong emphasis on transparent line of business separations

Competition objectives

- IN the Market
  - Parallel tracks (U.S. for example)
  - Trackage rights (U.S. and Canada)
  - Competitive access (E.U., Canada, Russia, possibly China – and Bulgaria)
- FOR the Market
  - Exclusive concessions, positive or negative, for PSO-type services such as commuters. Can include operating subsidies and investments

Rail versus rail competition in Europe: competition FOR and IN the market

- Competition for domestic passengers: Germany, Denmark, Italy, Netherlands, Portugal, Sweden and U.K.
- Systems already open for freight competition: Austria, Italy, Germaly, Netherlands, Sweden and U.K. Add Poland, Romania and Russia (?)

The Bulgarian approach

- The basic approach is similar to E.U. but will need to go farther to be consistent:
  - Separate passenger and freight and eliminate cross subsidies
  - Fully institute PSOs and competition for markets
  - Rationalize infrastructure access fees (cannot discriminate against freight): “social marginal cost” (?) for access fees
  - Eliminate subsidies to freight and to intercity passengers: PSO for social services
  - Clean up the books – once
- Unique opportunity to preserve rail role

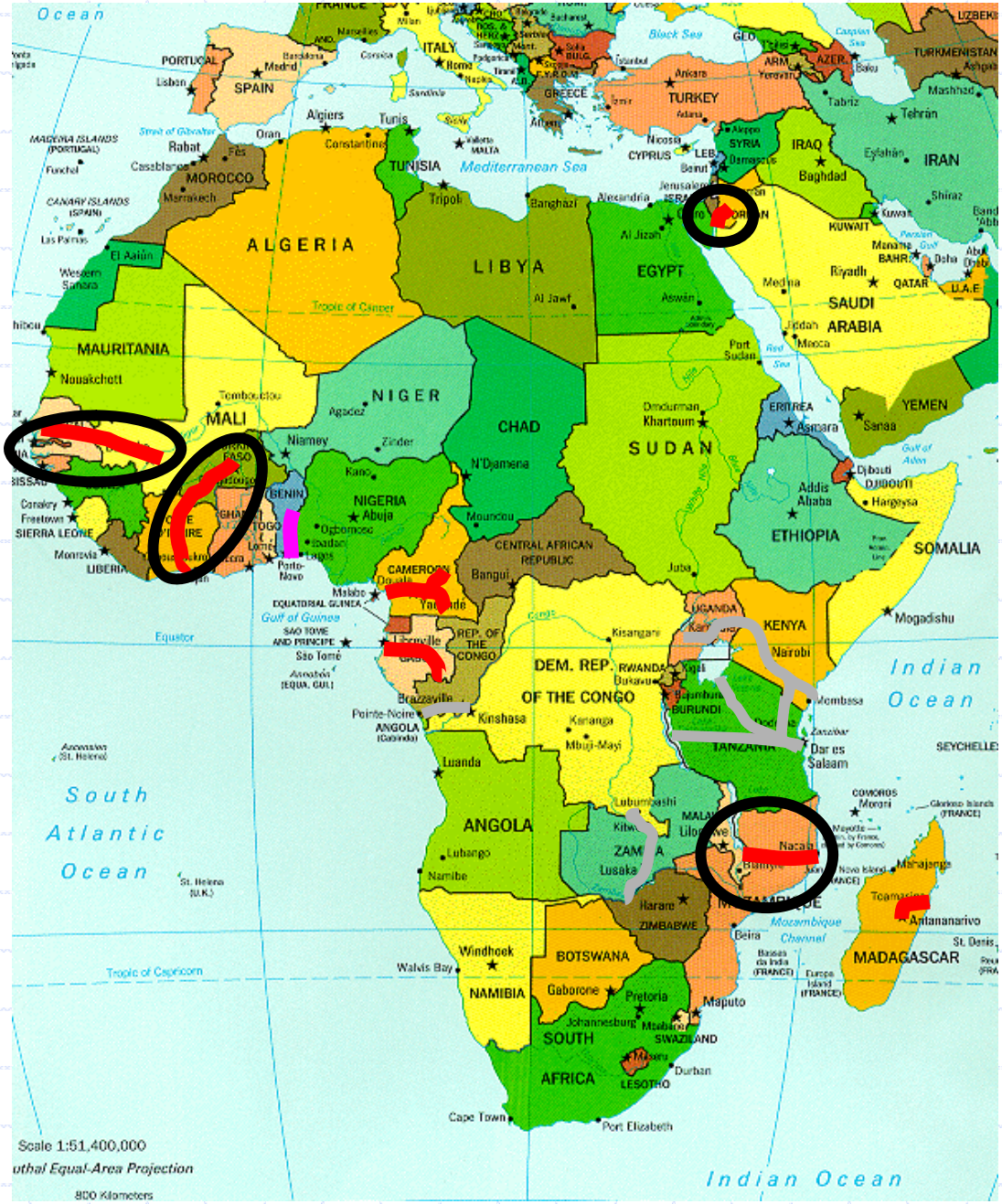
There is now very wide experience with change

- **Latin America – mostly freight (25) and passenger (10) concessioning, but some privatization (1)**
- **Africa – concessioning (5+)**
- **E.U. -- privatization and franchising: the U.K. experience is interesting, and positive**
- **CEE countries – restructuring and accession conformation**
- **Japan -- privatization**
- **India, China, Russia – restructuring to meet market competition**
- **Experience has been strongly (with exceptions) positive**

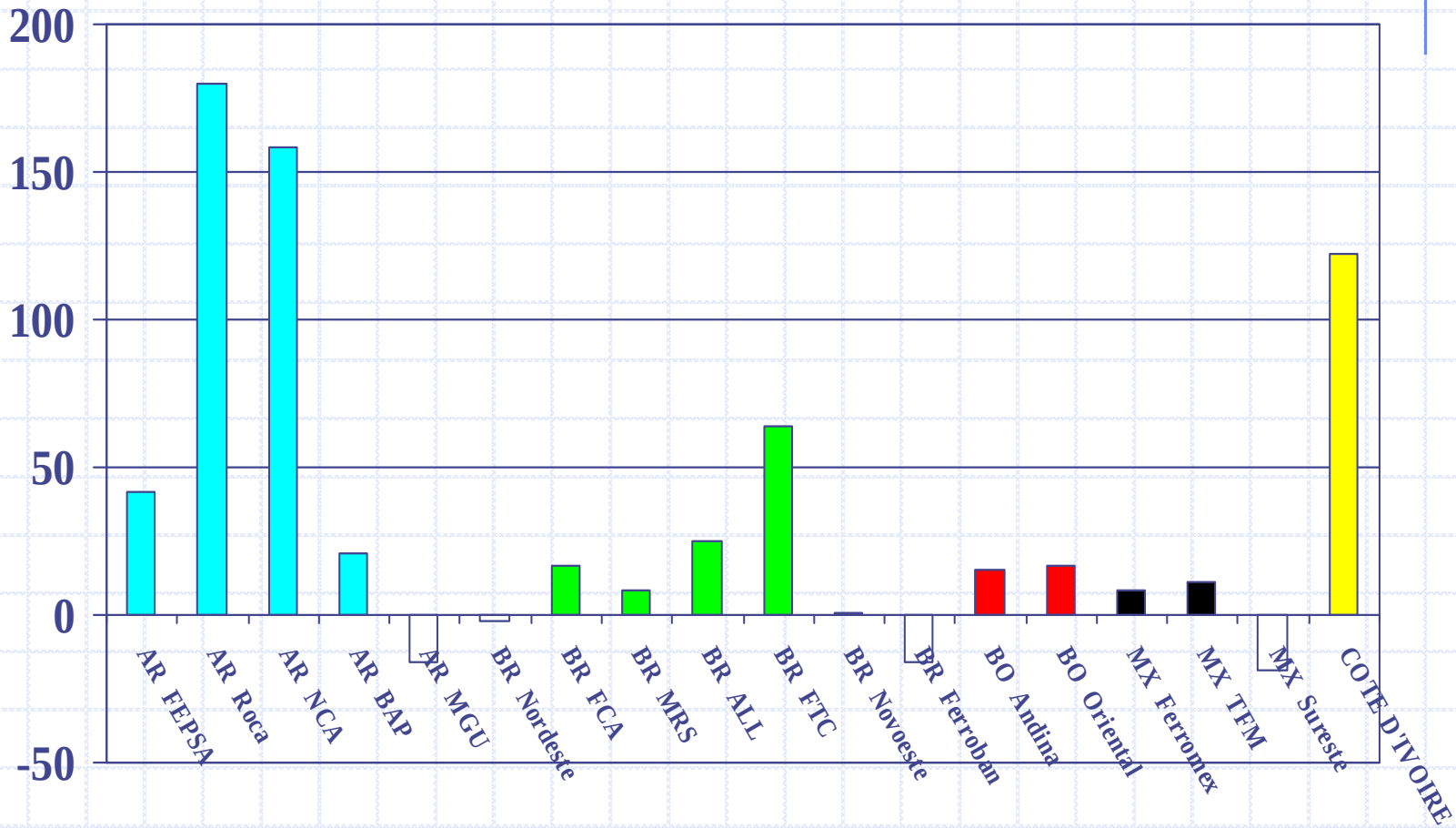
Ample experience with concessioning and privatization: it works

- Concessions and privatized railways are far larger and more complex than BDZ - EAD – and they have been quite successful
- Most important concessioning issues in Bulgaria:
  - Concessioning versus privatization (Argentina versus UK)?
  - Sale of assets versus shares
  - Level and structure of access charges on infrastructure
  - Separate concessions for passengers, or State operation?
- Poland is now approaching this issue, and Estonia has already done so


OCEANO
ATLANTICO

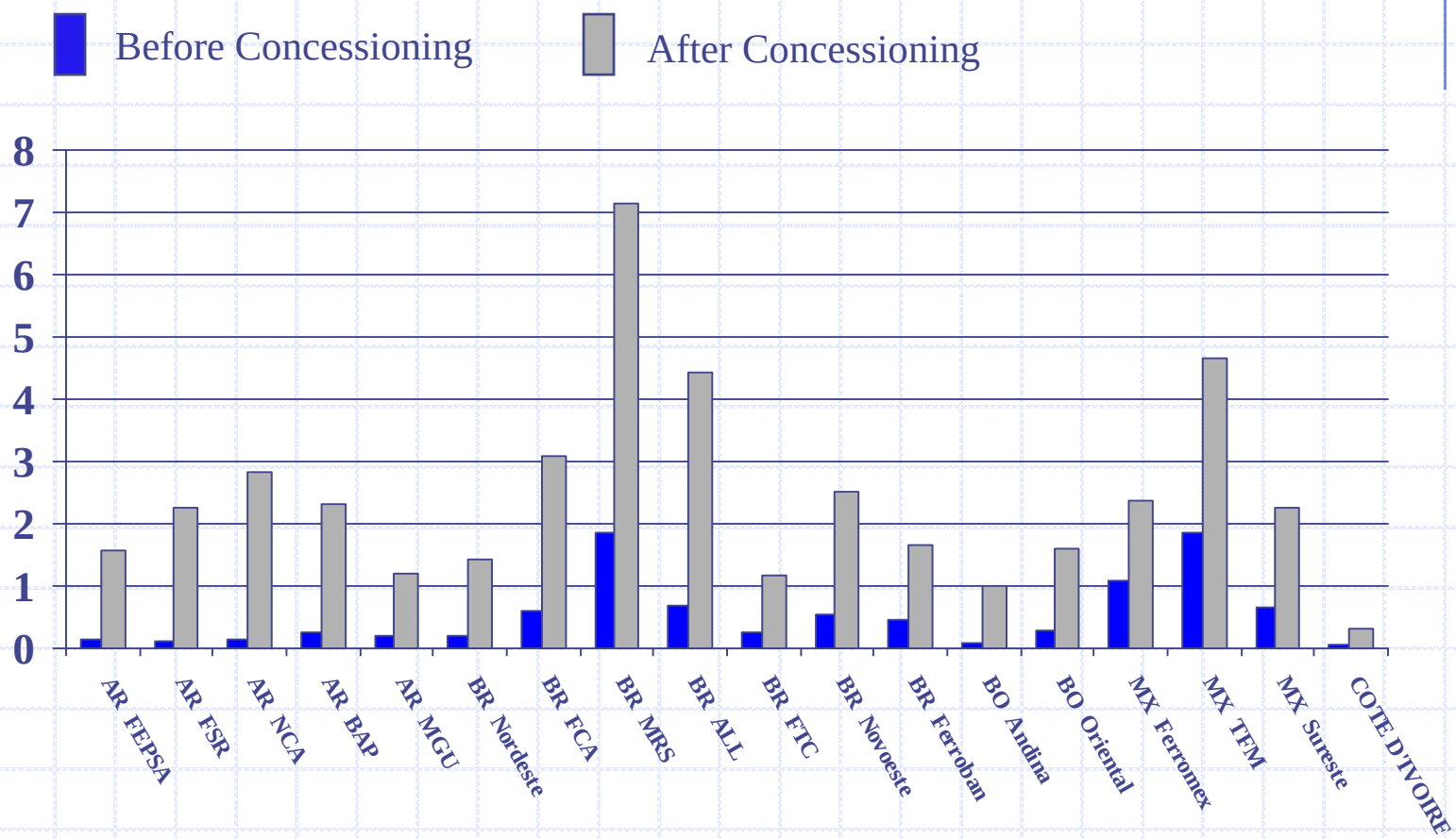

Concessioned
Bi-national concession
Being concessioned
Ocean
ALGERIA
LIBYA
EGYPT
MAURITANIA
MALI
NIGER
CHAD
SUDAN
NIGERIA
ETHIOPIA
SOMALIA
KENYA
ANGOLA
NAMIBIA
BOTSWANA
ZIMBABWE
MOZAMBIQUE
MADAGASCAR
SOUTH AFRICA
DEM. REP. OF THE CONGO
TANZANIA
ZAMBIA
SAUDI ARABIA
IRAN
IRAQ
TURKEY
GREECE
ITALY
SPAIN
PORTUGAL
MOROCCO
TUNISIA
Mediterranean Sea
Black Sea
Indian Ocean
South Atlantic Ocean
Gulf of Guinea
Tropic of Cancer
Tropic of Capricorn
Equator
Scale 1:51,400,000

Percent change in Ton-Km since concessioning



Labor productivity before and after concessioning

(000,000 TU/Employee)



Payments for concessions ($ millions)

	Freight			Passenger	
	Fees to Government	Committed Investments		Net Operating Subsidy	Cost of Capital Program
Argentina			**Argentina**		
FEPSA	36	218	Mitre	84	271
NCA	49	411	Sarmiento	(178)	276
Ferrosur Roca	15	166	Roca	(70)	48
BAP	71	344	San Martin	(45)	523
FMGU	2	58	Belgrano Sur	166	121
Brazil		1197	Belgrano Norte	197	87
FCA	317		Urquiza	102	82
ALL	216		Metro (Subté)	(439)	61.6
Novoeste	60		**Brazil**		
Tereza Cristina	19		Supervia (sub'n)	36	-244
MRS Logistica	889		Oportrans (Metro)	292	
Nordeste	16				
Bandeirantes	245		Total	145	
Chile					
Fepasa	30				
Ferronor	13		note: a negative number is a payment to government		
Bolivia					
FCO	26				
FCA	13				
Mexico					
TFM	1,400				
Ferromex	552				
Ferrosur	377				
Total	4,346				

Annual tariff savings from concessions

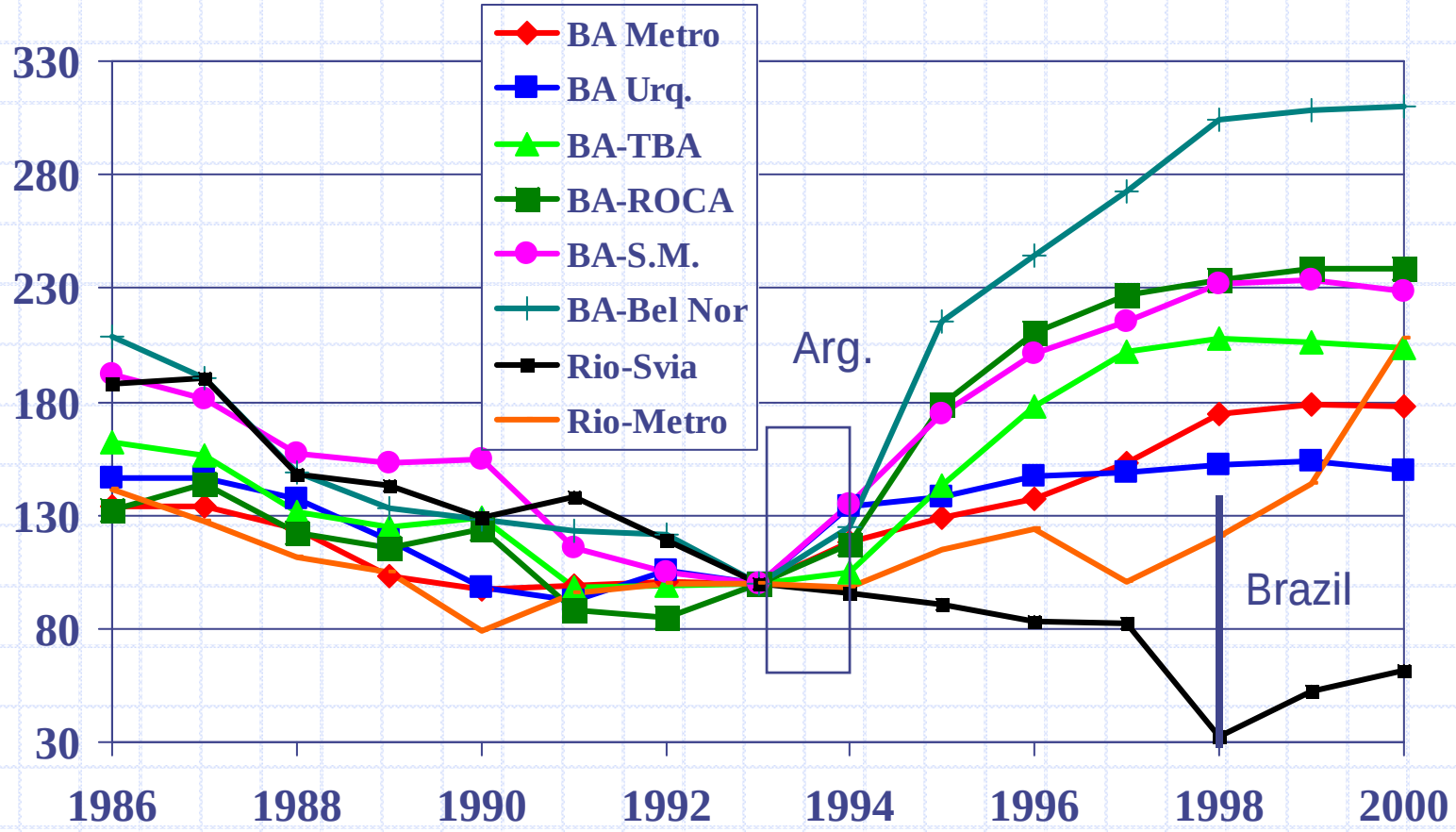
		Calculation of savings from lower rates				
	Initial Year	**Tariff in initial year (PPP$/Ton-Km)**	**Tariff in ending year tariff (PPP$/Ton-Km)**	**Ton-km in ending year**	**Total savings (million of PPP $)**	**% tariff reduction**
Cote d'Ivoire	95	0.123	0.106	523	8.9	13.8
Argentina Broad Gauge	93	0.039	0.036	6,898	20.7	7.7
Argentina Standard Gauge	94	0.032	0.043	495	(5.4)	-34.4
Bolivia FCO	96	0.147	0.123	626	15.0	16.3
Bolivia FCA	96	0.061	0.098	557	(20.6)	-60.7
Brazil:						
FCA	96	0.051	0.032	7,268	138.1	37.3
Novoeste	96	0.043	0.027	1,588	25.4	37.2
Nordeste	96	0.056	0.026	709	21.3	53.6
MRS	96	0.027	0.022	26,837	134.2	18.5
ALL	96	0.044	0.033	10,285	113.1	25.0
Tereza Cristina	96	0.120	0.101	259	4.9	15.8
Bandeirantes	98	0.038	0.023	5,984	89.8	39.5
Chile Fepasa	94	0.089	0.053	1,189	42.8	40.4
Chile Ferronor	96	0.072	0.046	743	19.3	36.1
Mexico -- TFM	97	0.054	0.043	17,256	189.8	20.4
Mexico -- Ferromex	97	0.041	0.036	20,638	103.2	12.2
New Zealand	92	0.104	0.081	4,078	93.8	22.1
Total					**994.2**	

Form of the suburban and metro concessions in Latin America

(and similar for the U.K. and E.U. franchises)

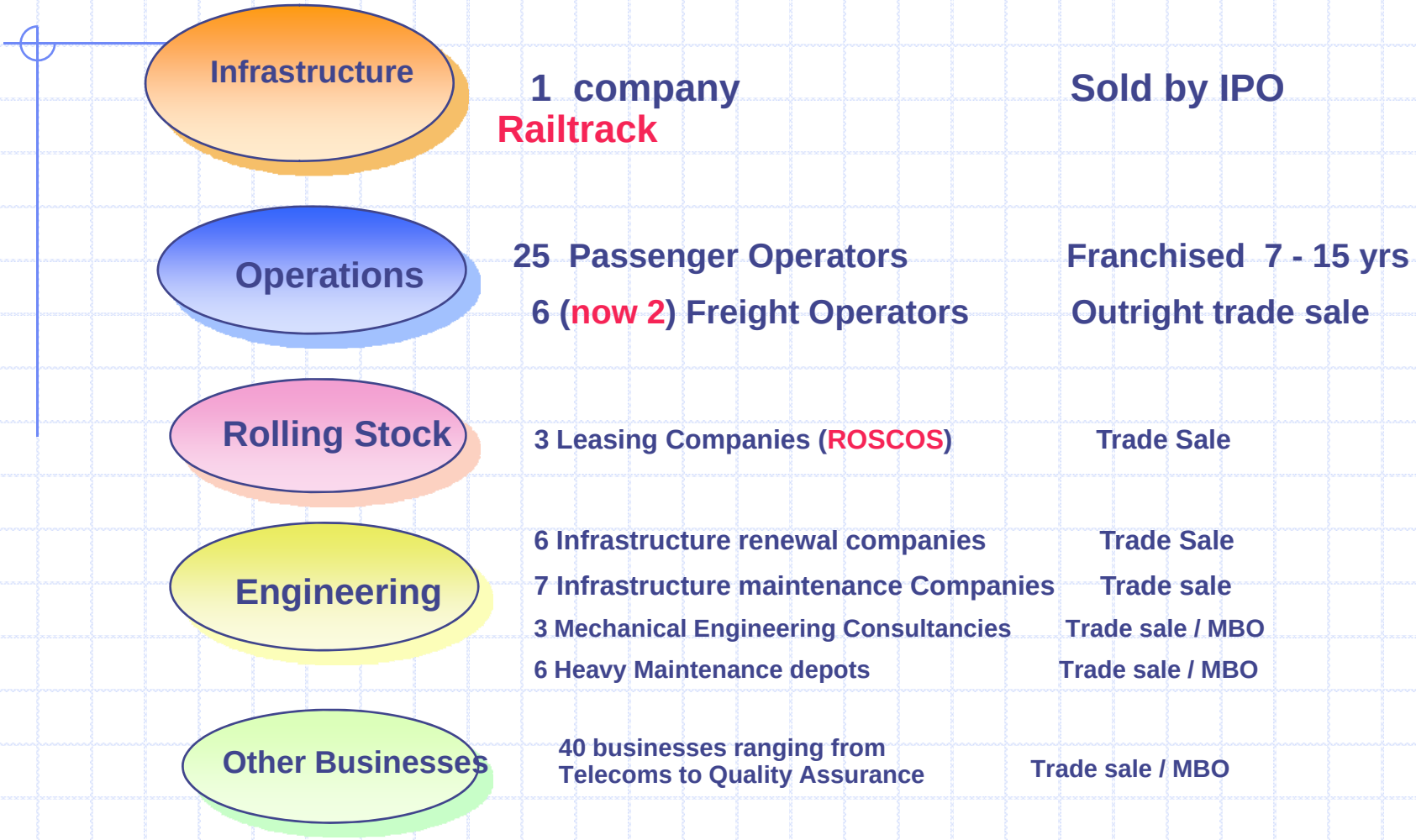
- Stated system to be operated
- Stated tariff policy (maximum)
- Stated service quality required (quantity, frequency, on-time, cleanliness, etc)
- Defined capital program in total – bidder chose the timing
- Competition for minimum cost to Government of subsidy and capital program (12% NPV)
- Awarded in the 1994/1996 timeframe
- Demand growth (200 to 400%), productivity up 300 to 400%

Ridership response to concessioning
(1993=100)

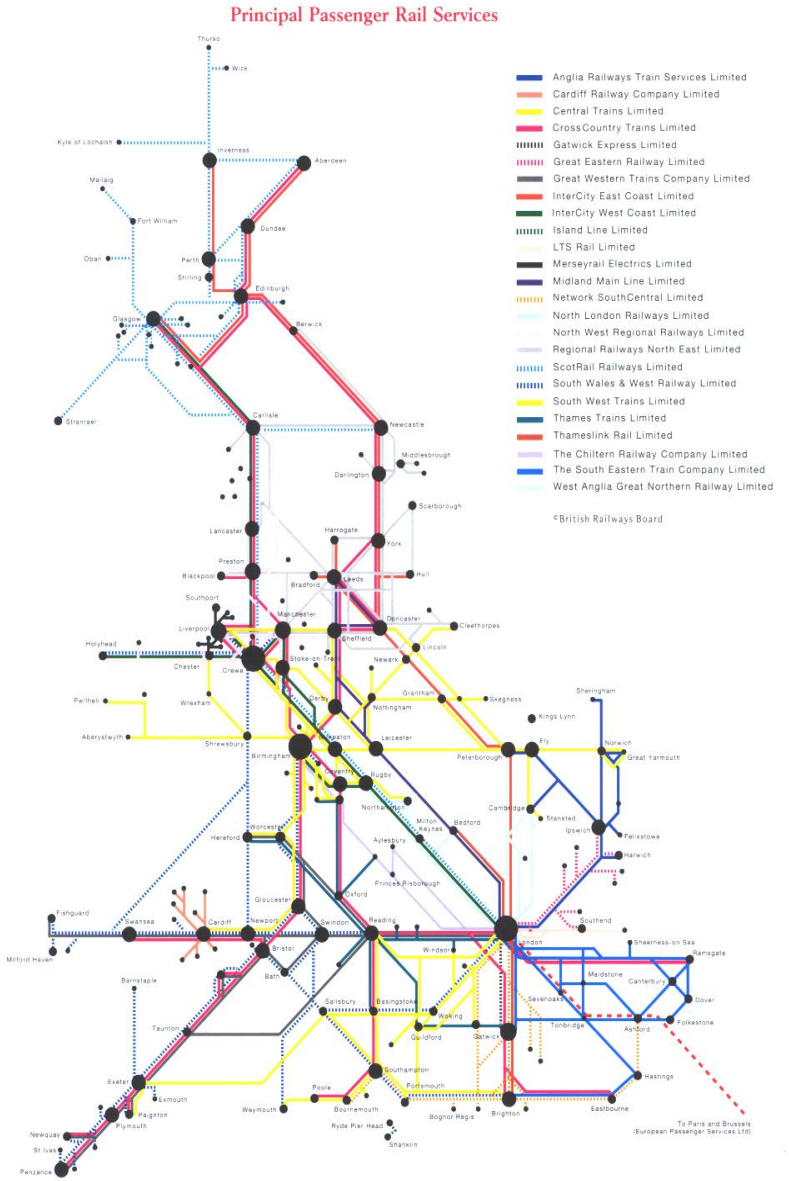


Note: Belgrano Sur removed in order to enhance detail of others.

BR After Privatization



UK Franchises

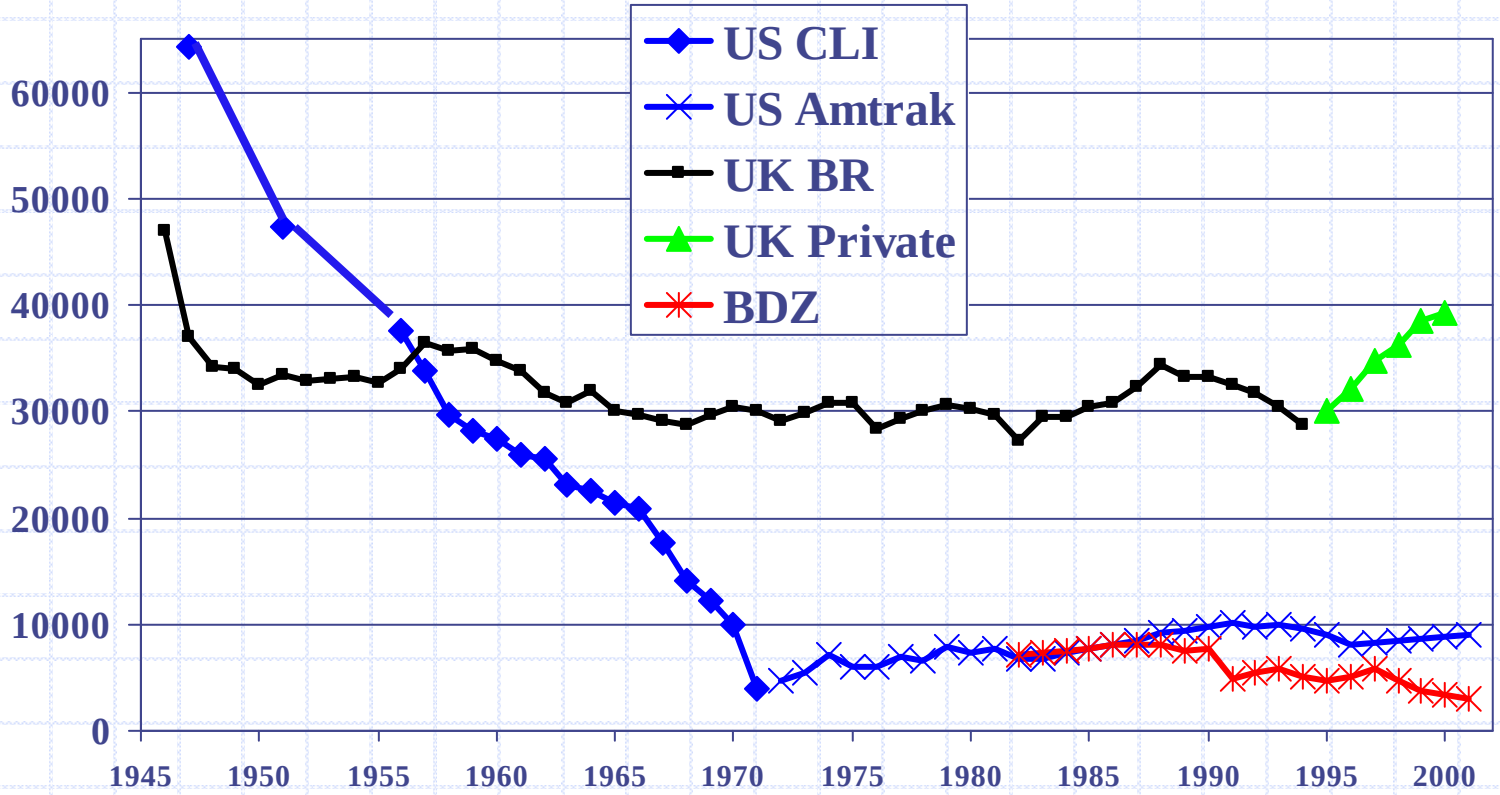


Note: This schematic map should be taken as a guide only and does not portray the complexity of the networks in the major conurbations.

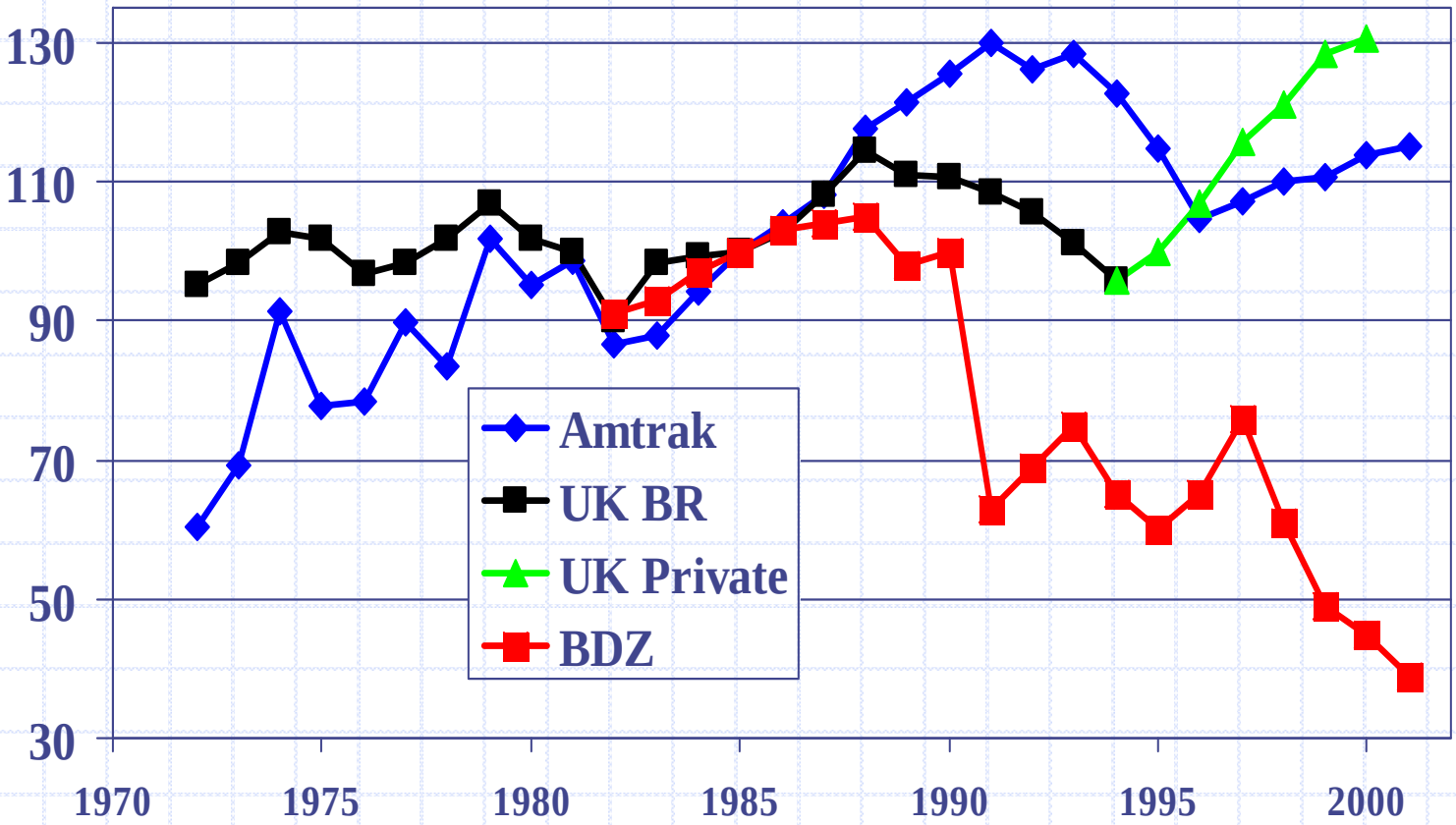
U.K. positive results

- Rapid demand growth
- Passenger-km highest since 1947
- Freight ton-km up 40 percent
- Rolling stock: replacement for 33 percent of fleet now on order ($4.4 billion)
- Railtrack investment up sharply before collapse
- Safety record improved
- On-time record returning to higher levels and system is operating efficiently

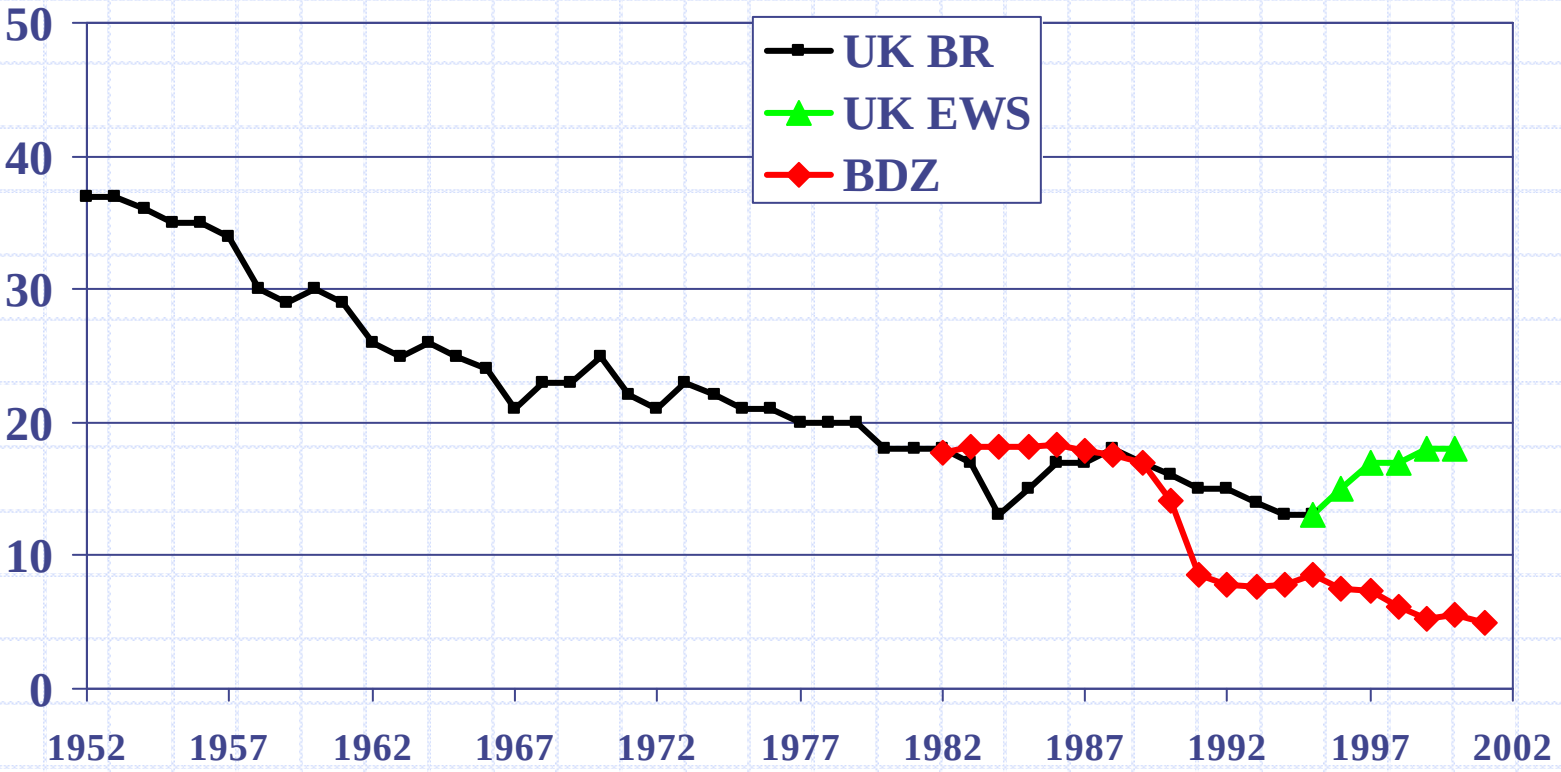
Passenger-km: U.S., U.K. and BDZ



Passenger-km Index: U.S., U.K. and BDZ 1985=100

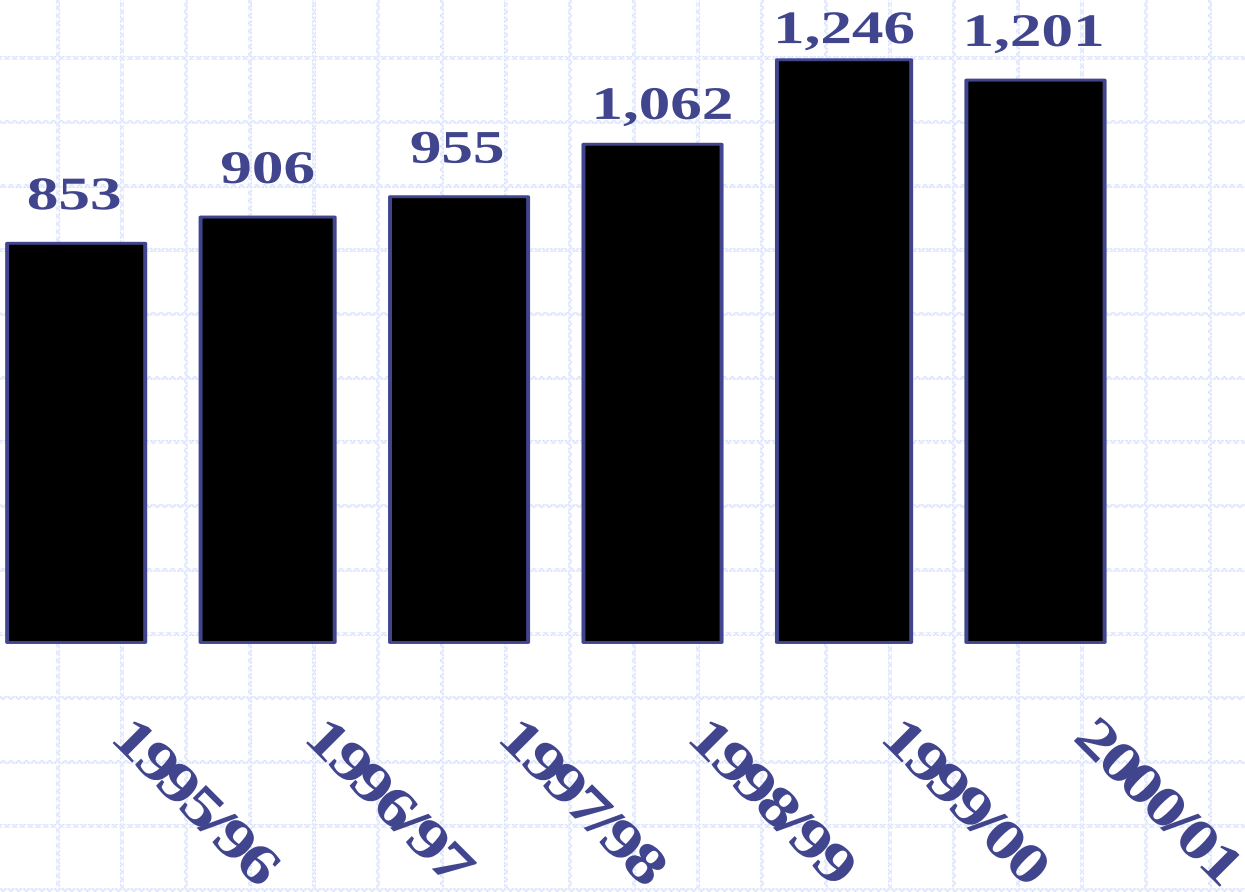


Freight ton-km: U.K. and BDZ

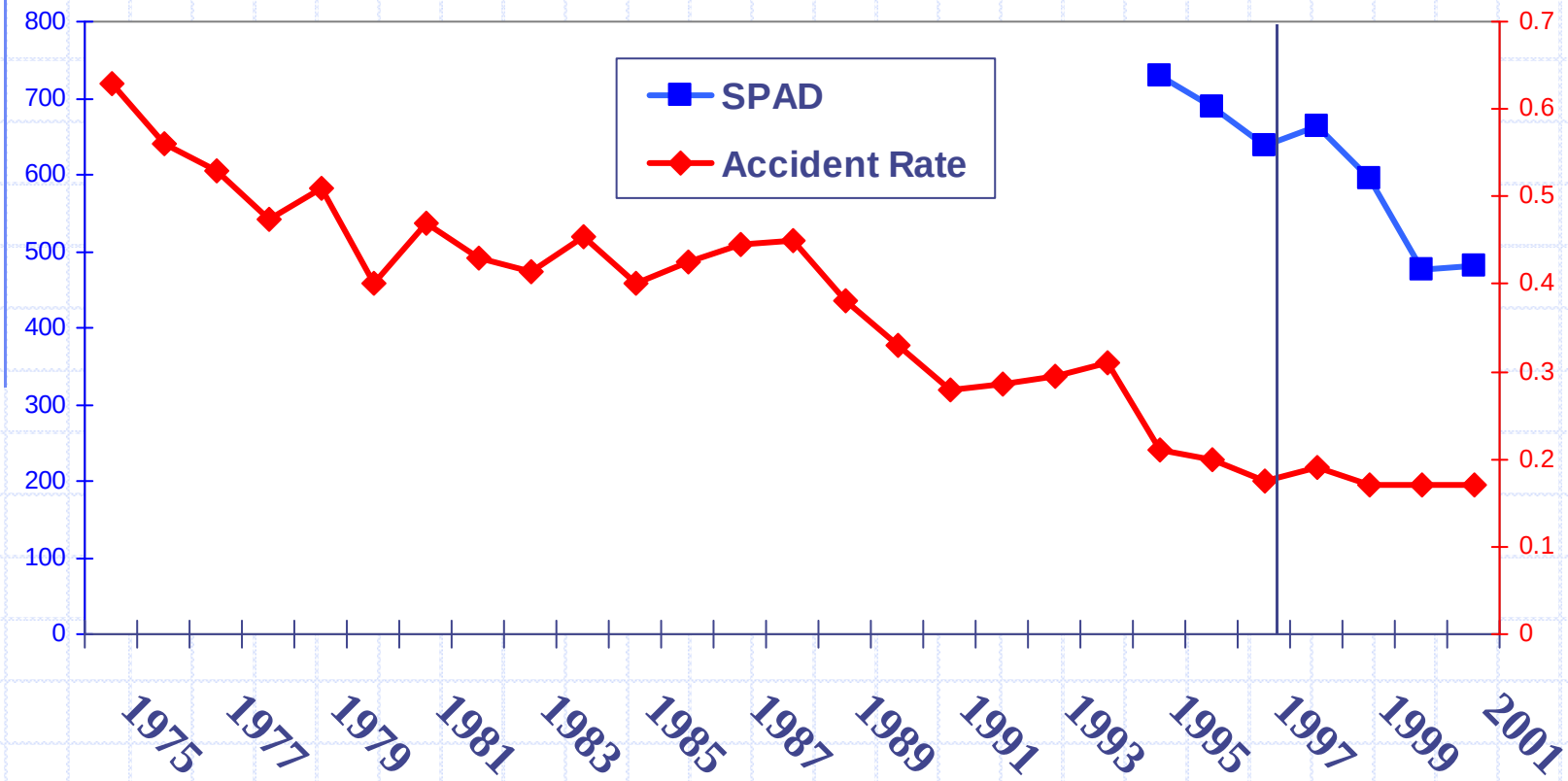


Source: Strategic Rail Authority, National Rail Trends, Dec, 2001

Railtrack investment by year



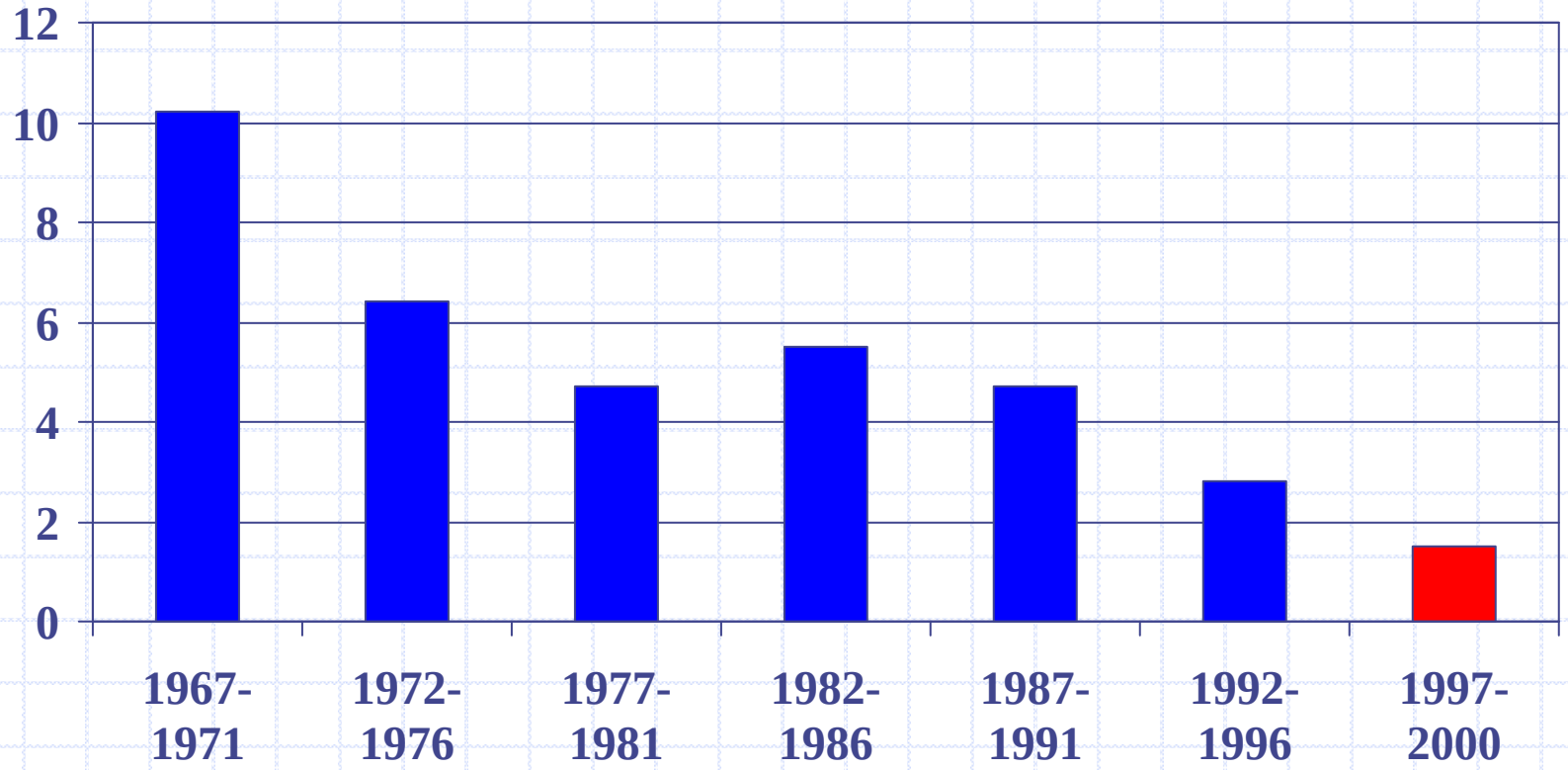
UK Safety Experience



"SPAD" means signals passed at danger

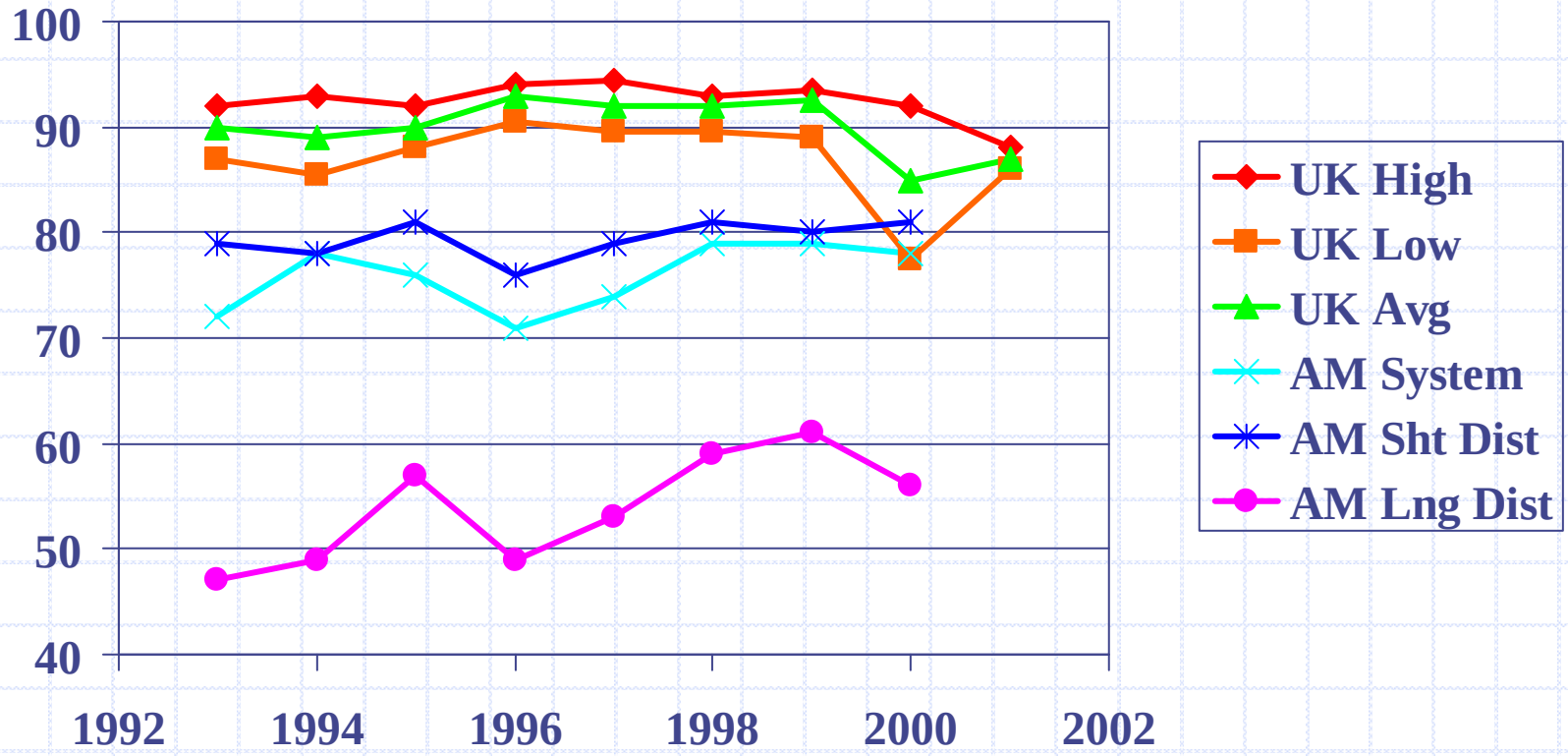
Source: Railway Safety, HM Chief Inspector of Railways' Annual Report 1997/98 and Andrew Evans

U.K. fatal accidents per billion train-km since 1967



Note: series averaged over 5 year intervals to smooth year-to-year variation
Source: Andrew Evans, "Estimating Transport Fatality Risk From Past Accident Data", University College London, January, 2002

On-Time performance (%): Amtrak and the UK TOCs



Source: Strategic Rail Authority, National Rail Trends, Dec, 2001
Note: U.K. on-time is <5 minutes, Amtrak short haul is <10 minutes

U.K.: the major negatives

- Railtrack management: too little rail expertise, impossible contracting structure. Inefficiencies.
- Adversary relationship: Railtrack and ORR, and (to a lesser extent) TOCs and Railtrack
- System in worse shape than realized by anyone
- Incomplete Government concept
  - Did not expect or provide for success
  - Early on, no concept of public role
  - Labor party opposed privatization, then had to manage it
- Access pricing regime created perverse incentives
- Complexity
- Unrealistic and unrelenting negative press coverage

UK: what are they doing now?

- Much stronger strategic vision (SRA)
- A **LOT** more public money ($50 billion in next ten years)
- Reducing number of franchises and adjusting franchise periods
- Strong pressure on the new infrastructure company management, and stronger contacts with users for coordination
- Readjusting access charges (lower fixed, higher variable, total recovery?)
- **NO** re-nationalization. Emphasis on fixing the problems, not major change in direction

Railtrack change

- Railtrack placed in “railway reorganization”
- Created non-shareholding “private company”
- Final status under consideration: may be sold to new, strategic investors

Lessons for restructuring

- Many approaches “work” – so don’t do nothing. In Bulgaria: “finish what you have started.”
- Get objectives and expectations right
- Mixed approaches can be best – avoid dogma
- Resolving social issues – especially labor – is critical to success

Assisting the labor transition

- Early retirement
- Severance benefit, based on final wages and length of service
- Relocation (including housing)
- Retraining before/after, general or specific vocational?
- Good communications
- Help to start new businesses?
- Worker (former and continuing) participation in new enterprises?

Transition issues

- Is private sector involved? If so, who pays labor, and who makes what decisions?
- When to do labor transition: before, during or after restructuring or privatization?
- Assistance to all employees, or only to affected employees
- Predicting the balance of measures actually chosen by employees

Results to date

- Three examples: Argentina, Brazil and Mexico
- Other recent experiences: Poland and Estonia, Cote d'Ivoire/Burkina Faso, Bolivia, Peru, Croatia
- How many employees affected
- Impact on productivity and costs

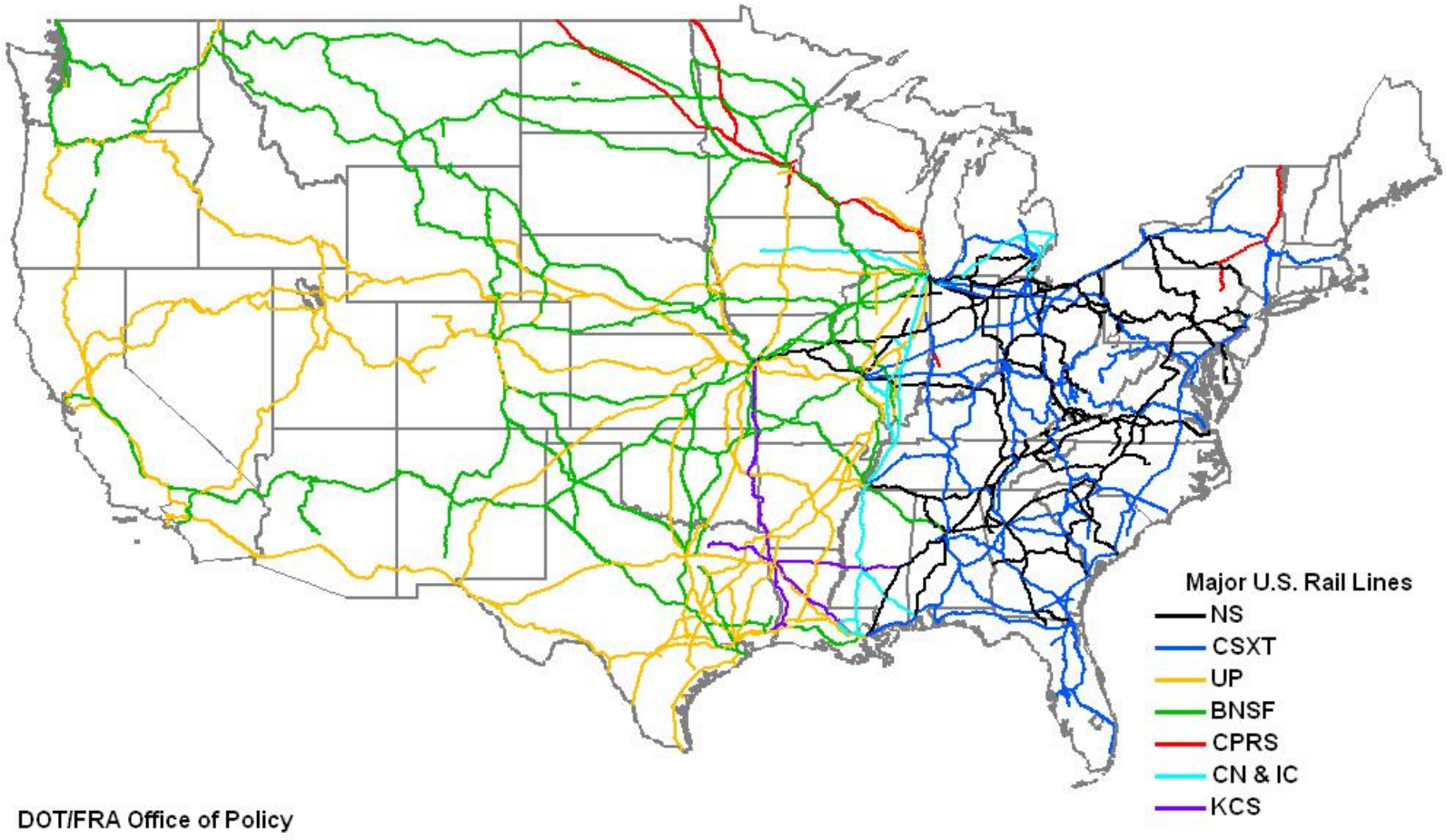
Example labor programs

	Employment Before/After	Early Retirement	Severance Benefits	Relocation Assistance	Retraining	Worker Participation in New Company
Argentina	82,000/12,900	50/55	1 month salary per year of service	No	No	Yes (3%)
Brazil	54,000/14,300	25/20 years service	1 to 2 months salary per year of service	Yes	Yes -- rail-specific and little used	No
Mexico	46,800/16,000	None- but sale value funded pensions	Single payment for value of Government employment rights	No	No	No
Poland	205,000/165,000	50/55	PZI 20,000/30,000, defined by unemployment rate in area of employment	No	Yes -- little used	No
Estonia	4,481/2,464	Up to 2 years with 50 % wages	Standard in law: 2-4 months bonus, plus notice payments plus 6 months unemployment	No	Yes -- centrally provided	No

Labor force changes

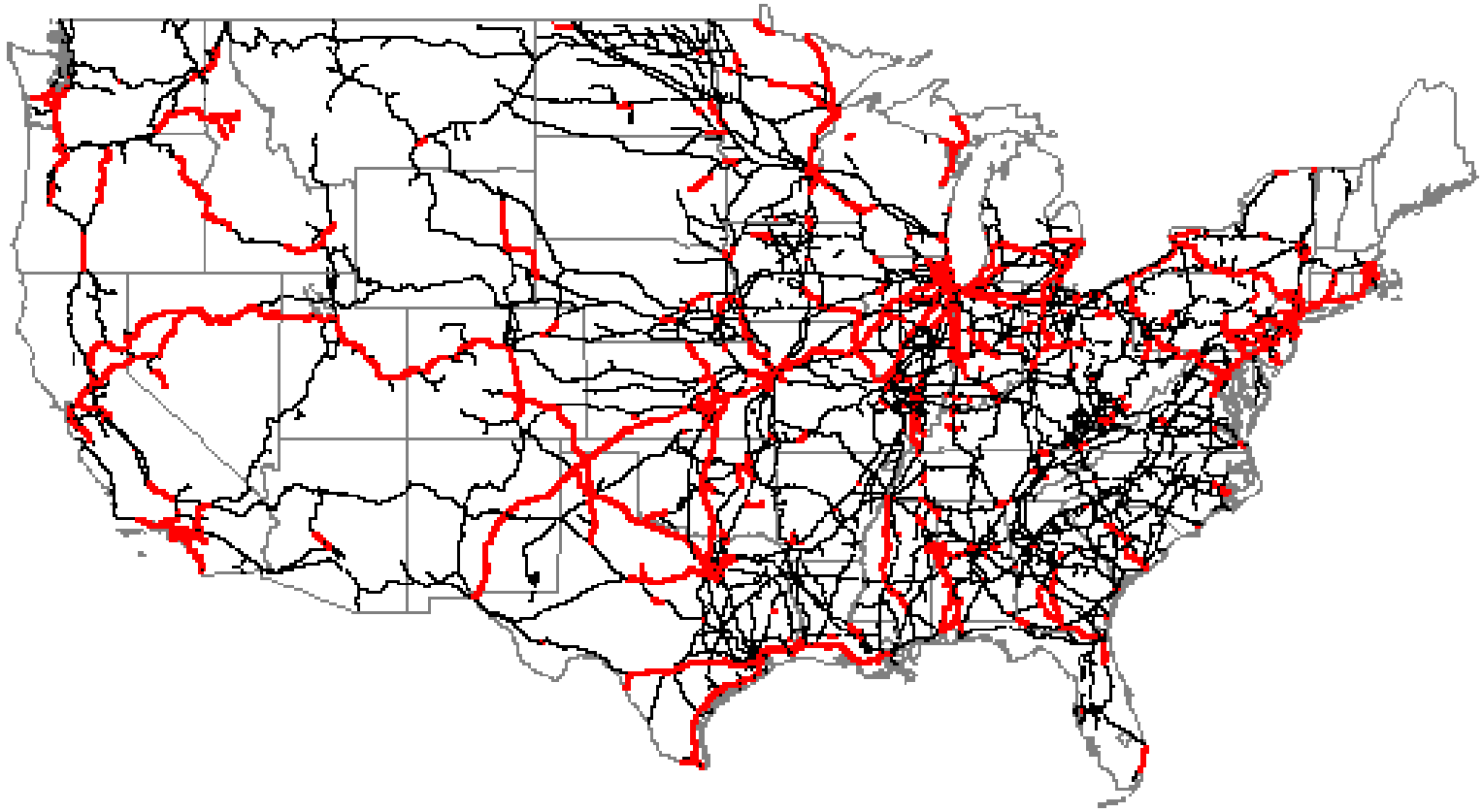
	Labor Force in Year Before Concessioning	Labor Force in Most Recent Year	Percent Reduction
Freight Concessions			
Argentina	67,000	5,300	92.1
Brazil	49,896	12,251	75.4
Bolivia	3,900	785	79.9
Mexico	46,823	16,000	65.8
Cote d'Ivoire/Burkina Faso	1,811	1,673	7.6
Passenger Concessions			
Buenos Aires Suburban	15,000	7,600	49.3
Buenos Aires Subté	4,750	2,100	55.8
Rio Suburban	4,170	2,236	46.4
Rio Metro	3,272	1,534	53.1

Competition on Parallel Tracks: U.S. Class I Railroads



Competition on the Same Tracks: Multiple Use U.S. Freight Tracks

(Excluding Amtrak)



Note: this is “dominant integral”, NOT open access