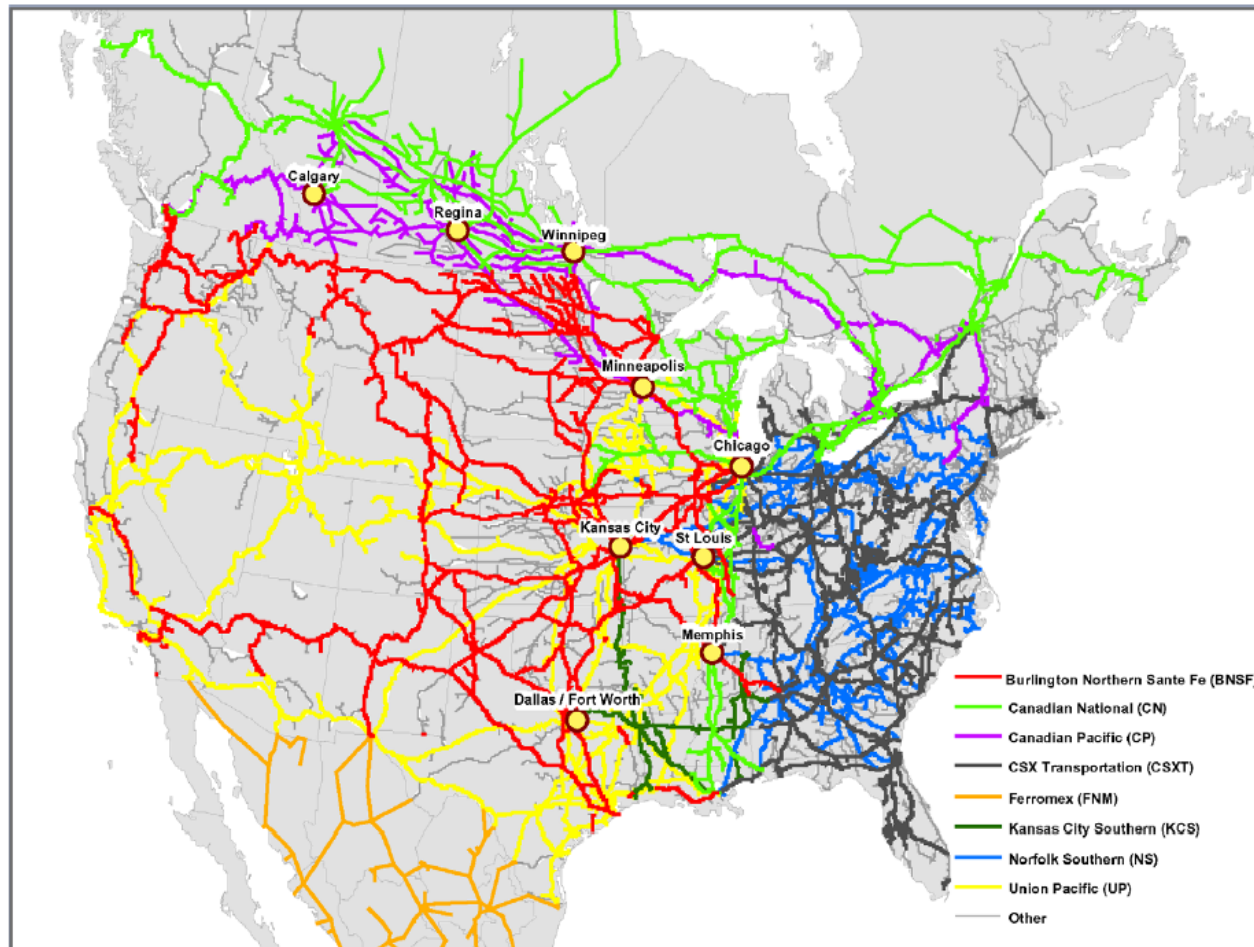# 8. OWNERSHIP (2)

Readings for Lecture 8

- Caves, D. W., & Christensen, L. R. (1980). The relative efficiency of public and private firms in a competitive environment: the case of Canadian railroads. *Journal of political Economy*, *88*(5), 958-976.
- Boardman, A. E., Laurin, C., Moore, M. A., & Vining, A. R. (2013). Efficiency, profitability and welfare gains from the Canadian National Railway privatization. *Research in Transportation Business & Management*, *6*, 19-30.
- Tomeš, Z. (2017). Do European reforms increase modal shares of railways?. *Transport Policy*, *60*, 143-151.

Learning Outcomes

- Is competition or ownership structure more important in determination of efficiency or output?

- Differences in organization or rail industry in North America and Europe

- Local public transport structures

8.1 Case: Canada freight railways

North American rail market

Source: Rodriguez (2008)

Canada rail sector

In the 20th century two big transcontinetal railroads:

- Canadian National (CN) – public
- Canadian Pacific (CP) - private

Ownership/competition

Public ownership Non-competitive enviroment	Private ownership Non-competitive enviroment
Public ownership Competitive enviroment	Private ownership Competitive enviroment

Canada (1980): Public ownership does or does not matter?

The efficiency of public and private firms is usually compared in industries which have heavy regulation and limited competition. In this paper we present a case study in which the effects of property rights can be isolated from the effects of regulation on noncompetitive markets. We compare the postwar (1956–1975) productivity performance of the Canadian National (public) and Canadian Pacific Railroads (private).

Caves, D. W. – Christensen, L. R. (1980): The Relative Efficiency of Public and Private Firms in a Competitive Enviroment: The Case of Canadian Railroads. *Journal of Political Economy*

Methodology

- Comparison of total factor productivity (TFP) – real output per unit of input

- In the paper, they estimated both the rates of growth of TFP and the relative levels of TFP for the CN and CP during the period 1956-75

Estimates

Table: Average annual growth rate of productivity of CN and CP

	CN	CP	CN relative to CP
1956-63	1.9	1.7	0.2
1963-74	4.4	3.3	1.1
1956-75	3.1	2.5	0.7

Conclusions

Contrary to the predictions of the property rights literature, we find no evidence of inferior performance by the government-owned railroad. We conclude that any tendency toward inefficiency resulting from public ownership has been overcome by the benefits of competition.

Discussion question

- Can you spot any weak point in argumetation of Caves and Christensen (1980)?

Privatization of CN

- In 1995 was Canadian National privatized after careful three years preparation
- Can we infer any interesting information out of this privatization?

Hypothesis

- If Caves and Christensen were right than we can expect no change in performance of CN due to privatization

Canada (2013)

This article describes and analyzes the privatization of Canadian National Railway (CN), a large railroad privatization.

It uses data from 1990 to 2011 to compare CN's post-privatization operating performance with its pre-privatization performance.

Boardman, A. E., Laurin, C., Moore, M. A., & Vining, A. R. (2013). Efficiency, profitability and welfare gains from the Canadian National Railway privatization. *Research in Transportation Business & Management*, *6*, 19-30.
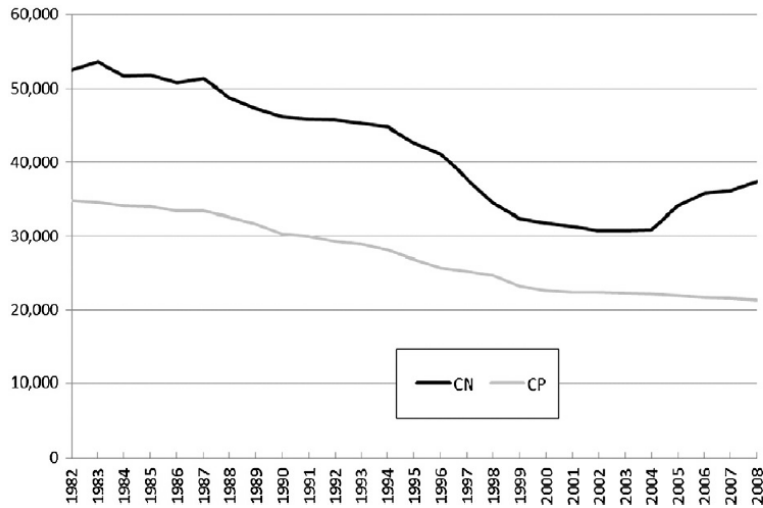
Canada: Output

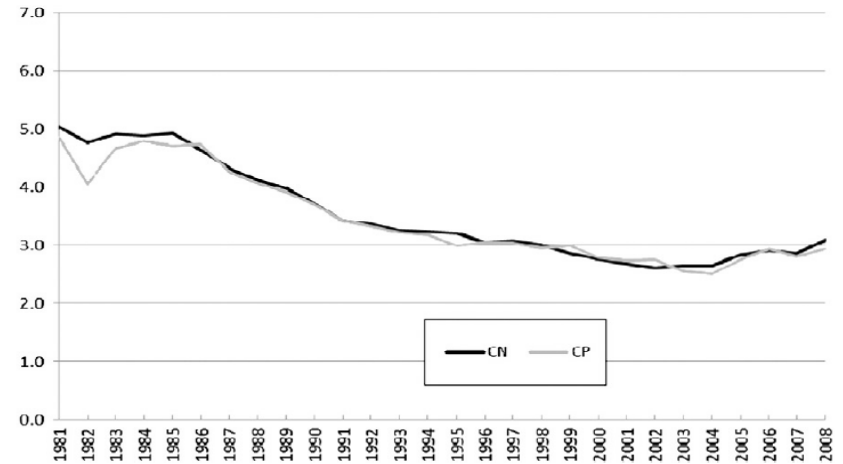

Fig. 1. CN and CP Canadian track operated (kilometres).

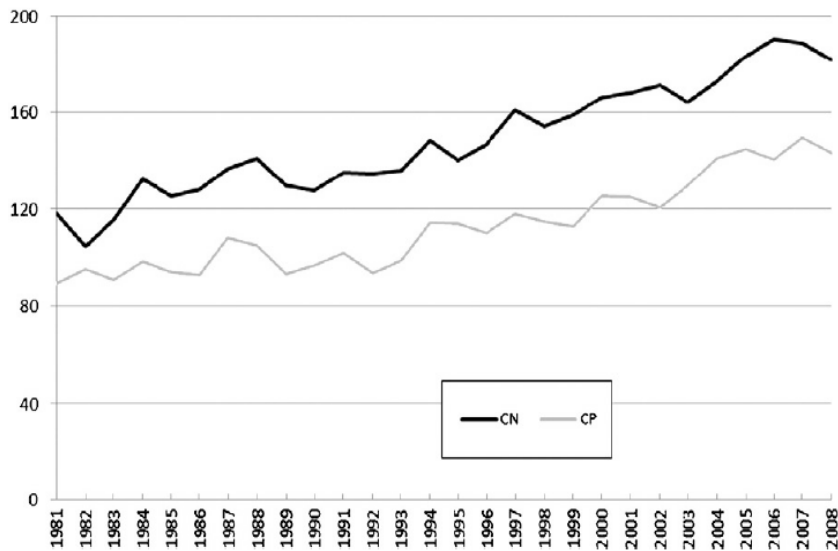Fig. 2. CN and CP freight prices per revenue tonne-kilometres in Canada (2011$).

Fig. 3. CN and CP freight output in Canada (millions of revenue tonne-kilometres).

Fig. 4. CN and CP market shares in freight in Canada.
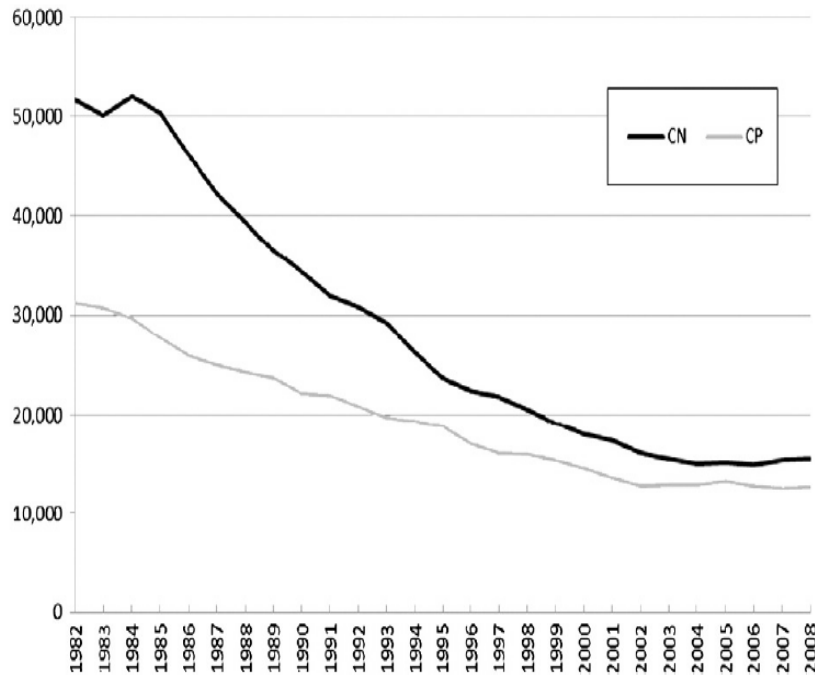
Canada: Employment and costs
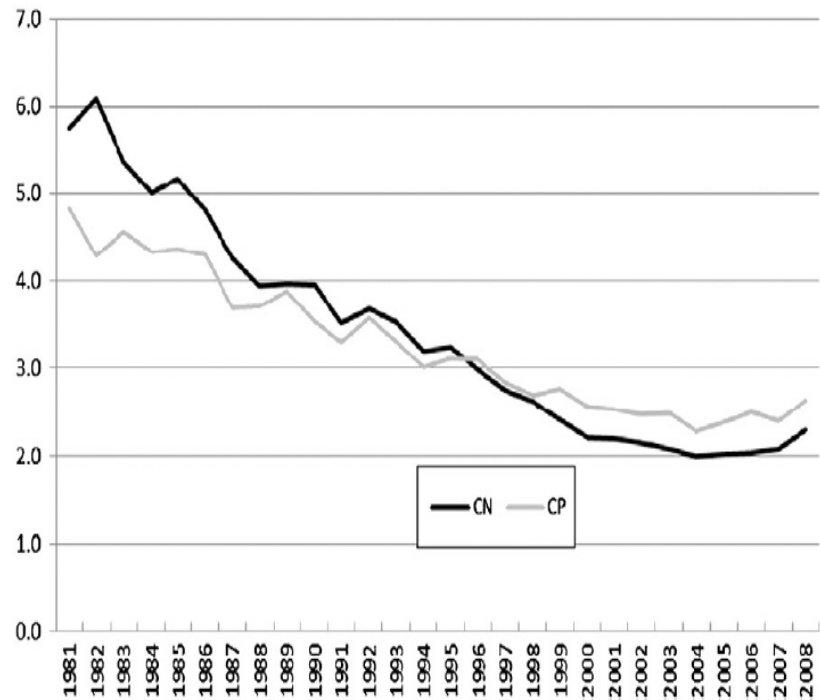

Fig. 5. CN and CP rail employment in Canada.

Fig. 6. CN and CP average total costs per revenue tonne-kilometre (2011$).

Boardman, A. E., Laurin, C., Moore, M. A., & Vining, A. R. (2013). Efficiency, profitability and welfare gains from the Canadian National Railway privatization. *Research in Transportation Business & Management*, *6*, 19-30.

Canada (2013): Ownership does matter?

The overall results demonstrate that CN performed substantially better following privatization, both from an operational perspective and from a broader social welfare perspective.

We find statistically significant increases over the long term (16 years following privatization) in sales, capital investment, assets, profit, profitability, productivity, dividends and corporate taxes paid.

There was little change in the capital structure of CN and a significant decrease in employment.

Using Canadian Pacific Railway as a basis for the counterfactual, we estimate that CN's privatization generated social welfare gains of approximately $25 billion in 2011 Canadian dollars.

The Canadian government received almost half of these gains, while CN's shareholders (most of whom were non-Canadian) captured the rest.

Boardman, A. E., Laurin, C., Moore, M. A., & Vining, A. R. (2013). Efficiency, profitability and welfare gains from the Canadian National Railway privatization. *Research in Transportation Business & Management*, *6*, 19-30.

Discussion question

- What are lessons from Canadian case study?

8.2 Competition or Privatization?

Tomeš, Z. (2017). Do European reforms increase modal shares of railways?. *Transport Policy*, *60*, 143-151.

Motivation

- 50% of road freight over 300 km should shift to rail and water and the majority of medium distance passenger transport should go by rail by 2050 (EC, 2011)

- These goals underpinned by reform initiatives (vertical separation and especially competition entry)

- However, there are many factors causing long term structural decline of railways (DiPietrantonio – Pelkmans, 2004) and net benefits of vertical separation are questioned by some scholars (Pittman 2003, van de Velde et al. 2012)

- Do European reforms actually increase modal share of railways? Or could be privatization more effective?

Railway reforms in the EU

- <u>Vertical separation</u> = a complete institutional separation of the infrastructure manager and the incumbent operator
- <u>Competition entry</u> = actual entry of the non-incumbent operators on the freight and passenger rail market
- <u>Horizontal separation</u> = institutional separation between passenger and freight operations of the incumbent
- <u>Freight privatization</u> = privatization of freight operator

Reform options
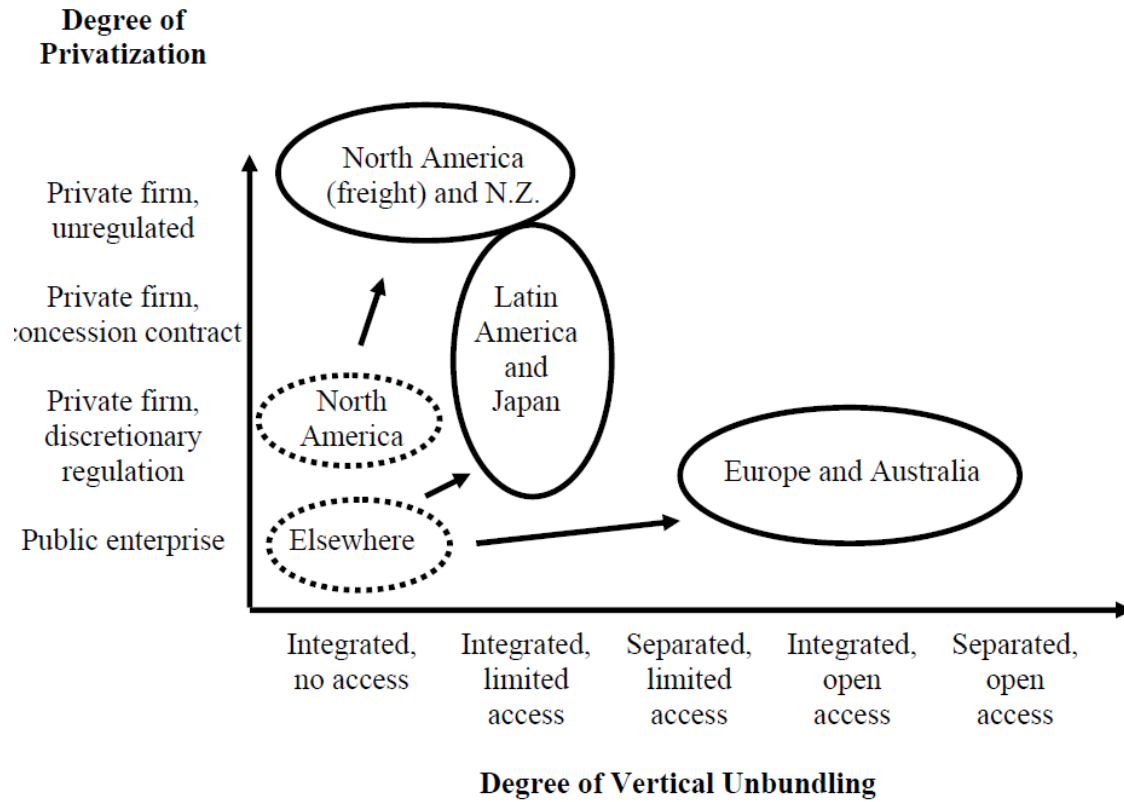
(Gómez-Ibánez, 2006)

Western x Eastern Europe

	Western	Eastern
Modal shares	Stable/rising	Falling
Government support	Stable	Insufficient/erratic
Incumbent's profits	Positive	Negative
Infrastructure investment	High	Low
Regulatory capacity	High	Low

Previous studies (1) – impact of reforms on effiecency

Authors	Period	Sample	Meth	EFFECT OF:			
				Vertical separation	Horizontal separation	Competition entry passenger	Competit entry freight
Cantos Sánchez (2001)	1973-1990	12	COST	~	+		
Driessen (2006)	1990-2001	13	DEA	+		+	-
Wetzel (2008)	1994-2005	22	SFA	0		-	+
Growitsch – Wetzel (2009)	2000-2004	27	DEA	-			
Asmild et al. (2009)	1995-2001	23	DEA	0		+	+
Friebel et al. (2010)	1980-2003	12	SFA	+		+	+
Cantos Sánchez et al. (2010)	1985-2004	16	DEA	+	+	+	+
Cantos Sánchez et al. (2012)	2001-2008	23	DEA	0		+	+
Mizutani et al. (2012)	1994-2007	25	COST	~	+		
Mizutani et al. (2014)	1994-2010	28	COST	~	+	0	0

Previous studies (2) – impact of reforms on modal shares

			EFFECT OF:					
			Vertical separation		Horizontal separation		Competition entry	
Authors	Period	Sample	Passenger	Freight	Passenger	Freight	Passenger	Freight
Drew-Nash (2011)	1998-2008	25	0	0				
Laabsch-Sanner (2012)	1994-2009	9	-	0			+	0
Van de Velde et al. (2012)	1994-2010	26	-	0	0	0	-	0
Kougioumtzidis (2014)	2003-2011	28	-	0				

Empirical strategy

- include all reform variables (VS, CE, HS)
- include broad sample of countries (27 = EU_15 + Switzerland and Norway + EU_10)
- explicitly control for differences between West and East
- data for period 1995-2013

Passengers

Dependent variable: MODAL SHARE PASSENGER
Estimation method: Fixed effects

	(1)	(2)	(3)	(4)
Reform variables				
VERTICAL SEPARATION	-1.685**	-0.7033*	-0.7703*	-0.7312*
	(0.7730)	(0.4126)	(0.4448)	(0.4174)
COMPETITION	-0.1281	0.06591	0.2638	0.2425
	(0.3153)	(0.2649)	(0.2209)	(0.2100)
HORIZONTAL SEPARATION	0.3559	0.9653**	0.6581	0.7470*
	(0.5712)	(0.4757)	(0.4204)	(0.4334)
Control variables				
ln_GDP_pc	-6.545***	-4.389***	-3.415***	-3.769***
	(1.941)	(1.259)	(0.6192)	(1.148)
WEST*TREND	0.1328***	0.08849**	0.1090***	0.08480***
	(0.04316)	(0.03621)	(0.02583)	(0.03214)
EAST*TREND	-0.004770	-0.0009085		-0.006439
	(0.08666)	(0.07908)		(0.07637)
HIGH SPEED	1.001**	1.147***	1.133***	1.139***
	(0.3948)	(0.4371)	(0.4256)	(0.4321)
EMPLOYMENT_RATE	0.2371**	0.04892		0.01817
	(0.1173)	(0.04402)		(0.03268)
PRICE_TICKET		-4.425***	-3.860***	-3.986***
		(1.162)	(0.9661)	(1.189)
PRICE_FUEL		1.607		1.142
		(1.079)		(0.9523)
ROMANIA*TREND			-0.5659***	-0.5507***
			(0.07509)	(0.07258)
Const	11.87***	18.32***	19.26***	18.45***
	(4.292)	(3.505)	(2.165)	(3.372)
# observation	513	458	458	458
# countries	27	27	27	27
Within R²	0.5440	0.5935	0.6638	0.6686
lnL	-818.9	-518.3	-474.8	-471.5

(based on HAC robust standard errors)
*** significant at 1 % level
** significant at 5 % level
* significant at 10 % level

Freight

Dependent variable: MODAL SHARE FREIGHT
Estimation method: Fixed effects

	(1)	(2)	(3)	(4)
Reform variables				
VERTICAL SEPARATION	-3.337*	-3.192*	-3.343*	-1.995
	(1.747)	(1.786)	(1.761)	(1.422)
COMPETITION	-0.5381	-0.6265	-0.4974	-0.3395
	(0.4716)	(0.4410)	(0.4510)	(0.4017)
HORIZONTAL SEPARATION	2.669*			
	(1.471)			
- WITH PRIVATIZATION		3.426**	3.385**	2.903*
		(1.705)	(1.697)	(1.631)
- WITHOUT PRIVATIZATION		1.201	1.456	1.756
		(2.325)	(2.301)	(2.500)
Control variables				
ln_GDP_pc	-14.67***	-15.03***	-14.39***	-13.46***
	(4.043)	(3.740)	(3.574)	(3.975)
WEST*TREND	0.3674**	0.3758**	0.2958**	0.2223
	(0.1620)	(0.1528)	(0.1414)	(0.1753)
EAST*TREND	-0.7854***	-0.7422***	-0.8272***	-0.9880***
	(0.2721)	(0.2610)	(0.2374)	(0.3201)
YEAR_2009	-1.557***	-1.522***	-1.589***	-0.8851
	(0.4800)	(0.4791)	(0.4554)	(0.7019)
INFRASTRUCTURE	0.08961	0.1006		0.1582**
	(0.06864)	(0.06668)		(0.07033)
PRICE_FUEL				4.143
				(3.827)
Const	60.08***	60.01***	66.97***	47.60***
	(10.63)	(10.10)	(9.240)	(9.923)
# observation	513	513	513	458
# countries	27	27	27	27
Within R²	0.7508	0.7531	0.7503	0.7383
lnL	-1308	-1306	-1309	-1118

(based on robust standard errors)
*** significant at 1 % level
** significant at 5 % level
* significant at 10 % level

Results

- Main results: vertical separation has a weakly negative impact on modal shares, competition an insignificant effect and horizontal separation a positive impact, especially when followed by freight privatization.

- These results in line with previous studies, but with stronger effects from horizontal separation with privatization.

Change in the modal share of passenger rail 1995-2013 (%)
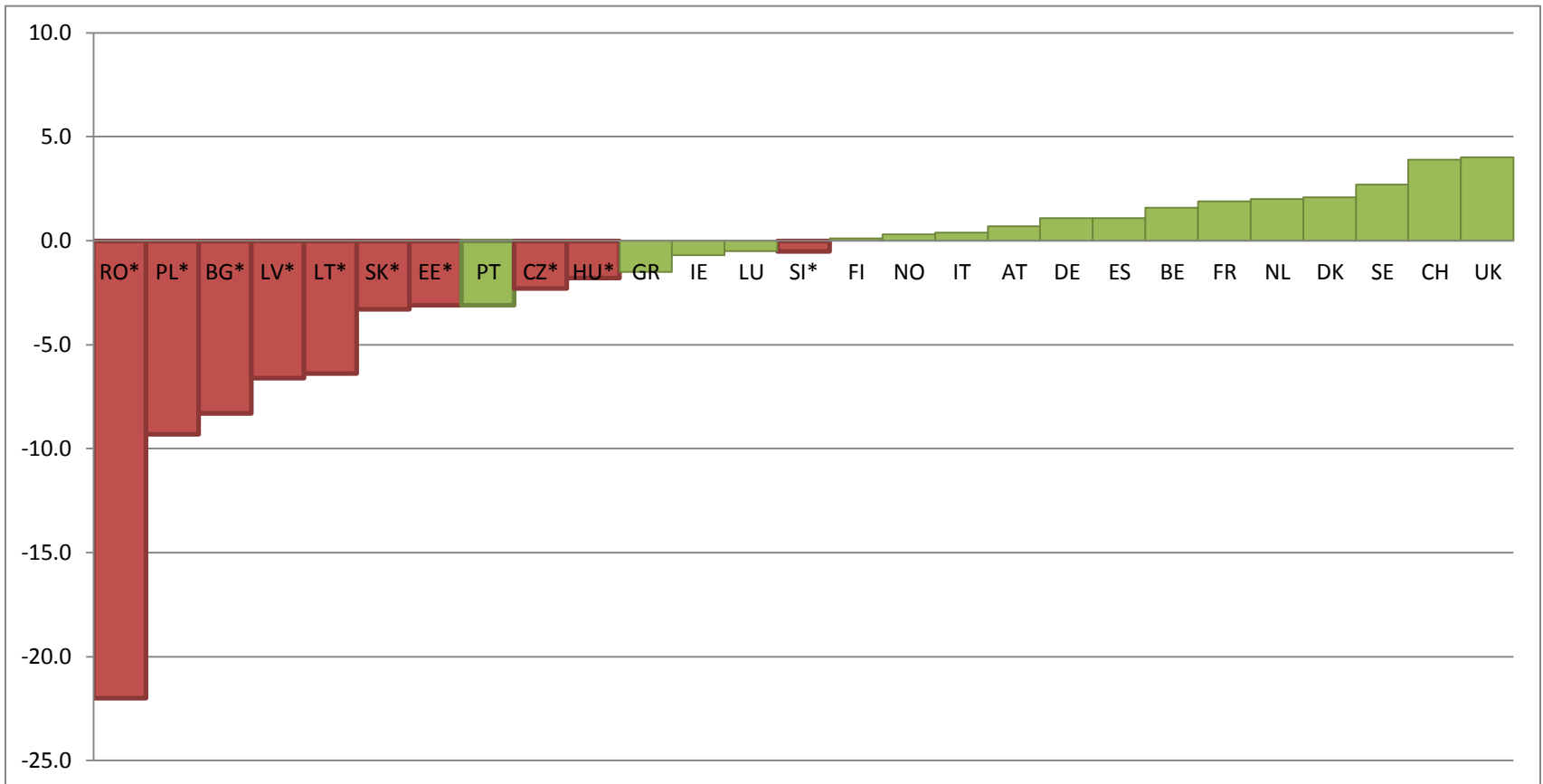
Change in the modal share of freight rail 1995-2013 (%)
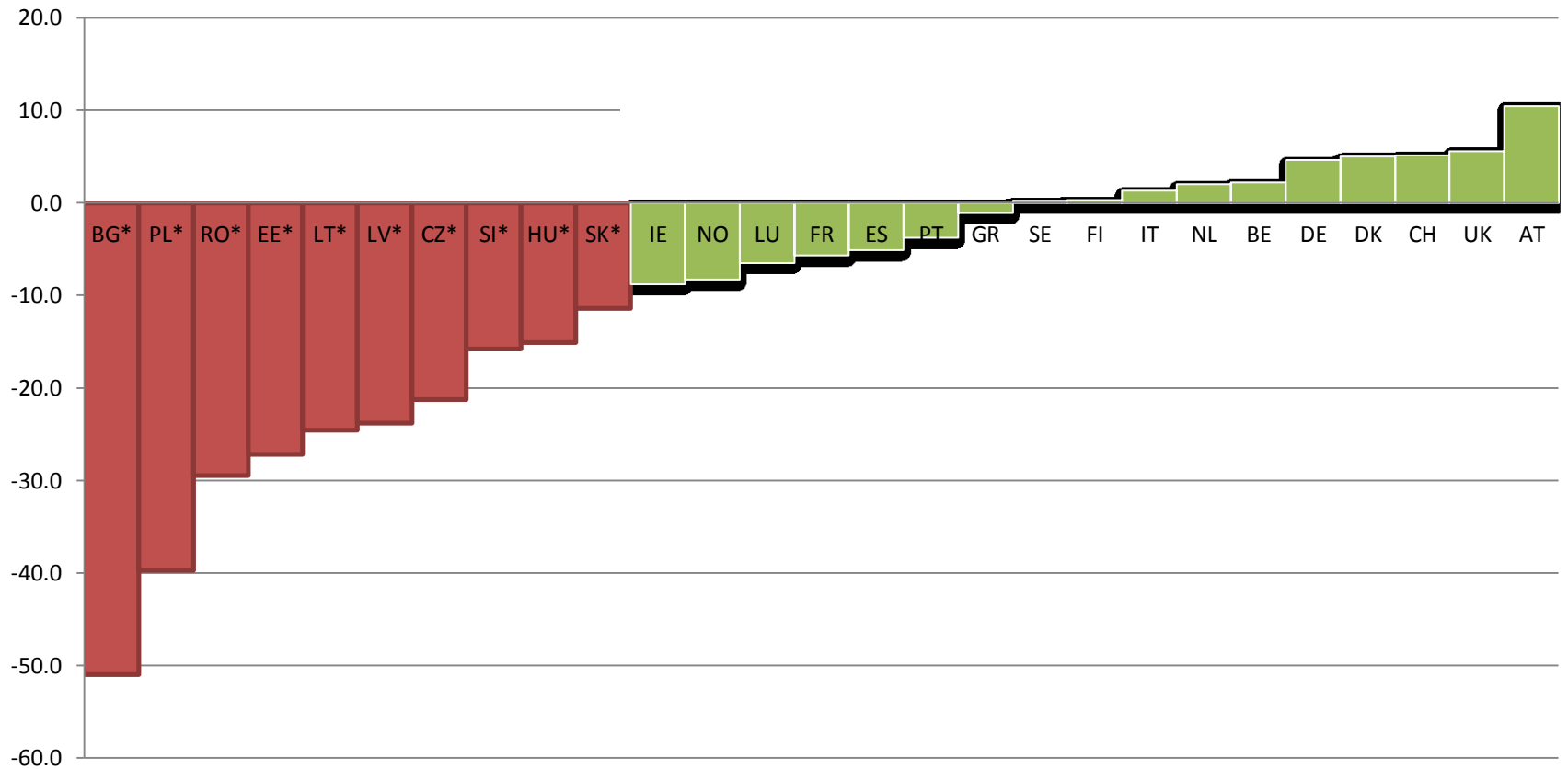
Discussion

- Vertical separation and competition entry do not increase modal shares of railways
  - Possible reasons? → incentives misalignment; advantages of integrated structures; strong intermodal competition.

- Horizontal separation generates better results, especially when followed by freight privatization.
  - Why? → elimination of internal cross-subsidies, higher managerial and financial independence of freight; less pressure from domestic political representation.

Conclusion

- There is no evidence that principal European reforms (vertical separation and competition entry) are increasing modal shares of European railways.

- The more promising reform strategy seems to be horizontal separation, especially when followed by freight privatization.

- There are significant differences in the long term development of railway's modal shares between Western and Eastern Europe.

8.3 Competition or Privatization?

Local public transport

Local public transport

Boitani – Nicolini - Scarpa (2010) investigated whether competition and ownership matter in local public transport in Europe. This paper investigates how the ownership and the procedure for the selection of firm operating in the local public transport sector affect their productivity.

Methodology

- In order to compare different institutional regimes, they carried out a comparative analysis of 72 companies operating in large European cities.

- This allows them to consider firms selected either through competitive tendering or negotiated procedures.

- They also control for ownership form

Exercise

- Their results are in the table. You task is to identify whether competition or ownership has higher impact on their productivity. Based on their results, what are other important determinants of productivity?

Results

Table 10: Total factor productivity estimation

Total sample

	(1)	(2)	(3)	(4)	(5)
Metro	-0.121***	-0.0810**	-0.102**	-0.0729*	-0.115**
	(-3.253)	(-2.090)	(-2.514)	(-1.760)	(-2.550)
Metro services	0.257**	0.272***	0.231**	0.247**	0.212**
	(2.530)	(2.677)	(2.139)	(2.303)	(2.068)
Tram	-0.290***	-0.336***	-0.239***	-0.284***	-0.234***
	(-7.876)	(-8.608)	(-6.619)	(-7.541)	(-6.704)
Bus	-0.109	-0.113	-0.153*	-0.150*	-0.248***
	(-1.275)	(-1.331)	(-1.814)	(-1.804)	(-2.638)
Extra-urban services	-0.0361	-0.00661	-0.0740**	-0.0409	-0.00673
	(-0.989)	(-0.179)	(-2.175)	(-1.175)	(-0.172)
Group member	0.0973**	0.0332	0.0224	-0.0331	-0.0203
	(2.072)	(0.684)	(0.460)	(-0.678)	(-0.437)
Competition		0.183***		0.176***	0.176***
		(3.630)		(3.707)	(3.561)
Mixed own.			-0.0175	-0.0128	-0.0281
			(-0.426)	(-0.335)	(-0.714)
Mainly public mixed own.			-0.182***	-0.196***	-0.212***
			(-5.117)	(-5.741)	(-6.183)
Fully public own.			-0.237***	-0.204***	-0.216***
			(-4.169)	(-3.913)	(-4.357)
City population density					0.0206
					(0.444)
Observations	434	434	434	434	427
R-squared	0.242	0.266	0.279	0.300	0.323

Conclusions (1)

- Firms selected through competition for the market present higher levels of productivity.

- Ownership matters: public firms are generally less productive than private firms, and so are mixed firms.

- Moreover, our results provide support to the idea that the presence of some private shareholders is associated to higher productivity, probably because of the influence exerted on managerial choices by private shareholders.

- This result calls for further theoretical investigation on the nature and performance of mixed ownership firms.

- Finally, we observe that available indicators of city characteristics rarely affect local public transport firms TFP, except for possible negative congestion effects on ground transport services in large cities.

Conclusions (2)

- Caution is needed when drawing policy implications from our results.

- However, there is a mild indication that in the European countries under exam competitive processes have been able to select more efficient firms than negotiated procedures. This may well depend on the poor quality of the local bodies in charge at negotiating the contracts, or on other causes which are beyond the scope of the present analysis.

- Whatever the reason, policy proposals advocating a limitation of competitive procedures in this institutional context would need to provide very strong evidence that negotiations yield better results.

Conclusions (3)

- As for ownership, the results above show no ambiguity: firms in public hands are less productive than private ones.

- However, the higher productivity of private firms may have at least two drivers. The first is that private shareholders simply have stronger incentives to make sure that the firm is efficient.

- The second one is that during the privatization process of the last few years more productive and profitable firms have been sold to private shareholders, so that only less productive firms have now remained in public hands.

Conclusions (4)

- Understanding which explanation is preferable would require further analysis.
- However, it is apparent that privatization could be a solution only if the power of incentives is the dominant driver of private firms higher productivity.
- Otherwise, the path to efficiency is far more complex. If one wants to consider the privatization option, our evidence indicates that mixed firms are still less efficient than private ones.
- Hence, if privatization is to be chosen, it seems preferable to go all the way (or most of the way) to private ownership.

Conclusions (5)

- However, both competition and privatization are no panacea: indeed, they may have different effects in different set-ups, and may fail to deliver the expected benefits under some circumstances.

- In particular, although available data do not include the contractual structure, it has to be highlighted that a careful contractual design is crucial in providing the proper incentives to efficiency, with or without competitive tendering, with privately or publicly owned firms.

8.4 Summary

Summary (1)

- Caves- Christensen (1980) we find no evidence of inferior performance by the government-owned railroad CN. They conclude that any tendency toward inefficiency resulting from public ownership has been overcome by the benefits of competition.

- Boardmann et al. (2013): The overall results demonstrate that CN performed substantially better following privatization, both from an operational perspective and from a broader social welfare perspective.

Summary (2)

- In European rail freight, the privatization is more effective than comeptition entry in stimulating output and efficiency
- In local public transport, firms selected through competition for the market present higher levels of productivity. Also ownership matters: public firms are generally less productive than private firms, and so are mixed firms.

Readings for Lecture 9