

Rail Sector and Regulation in Brazil

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Rail Sector in Brazil: the Big Picture

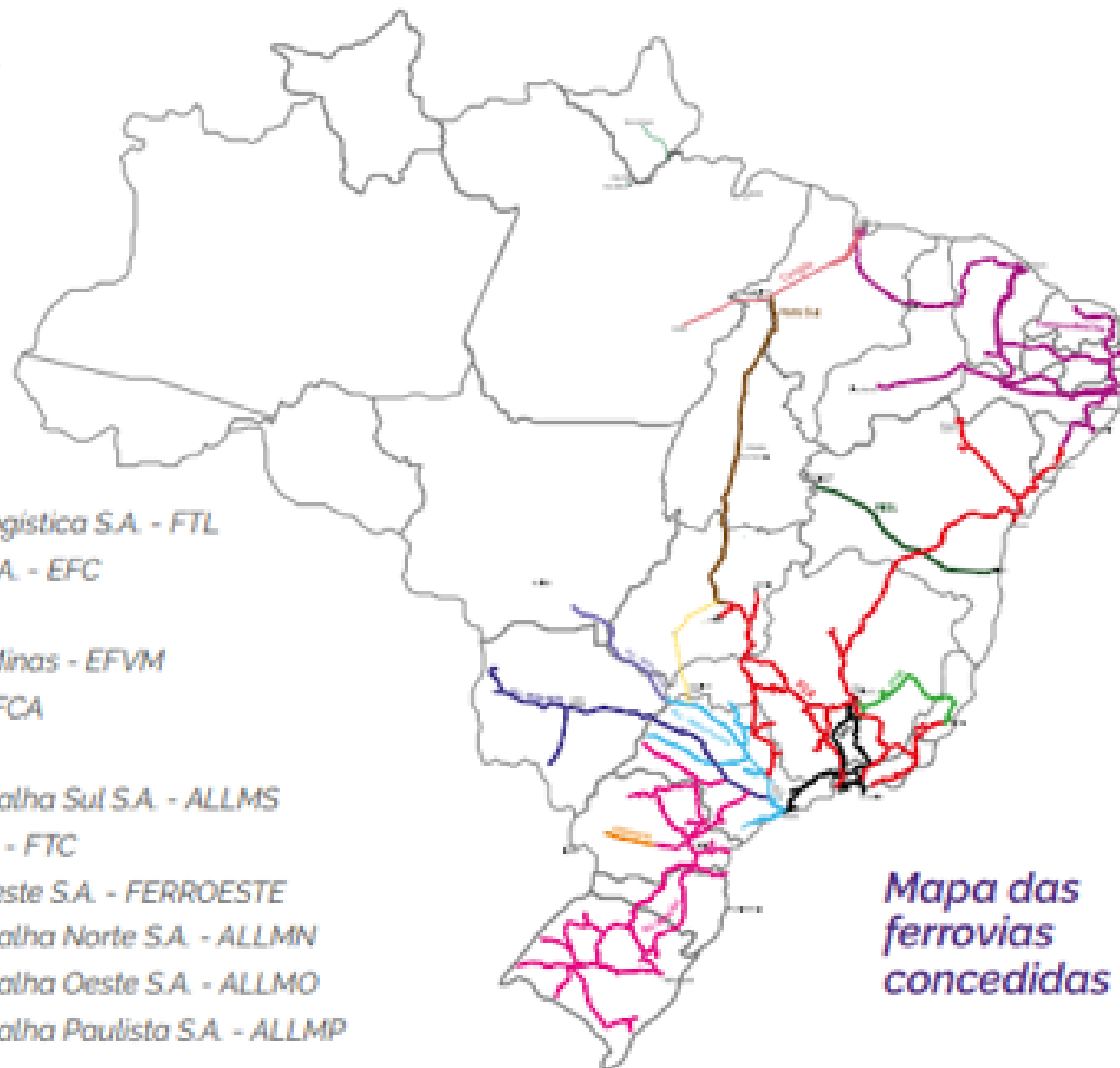


O sistema ferroviário nacional conta com uma extensão de **30.576 KM**



22 estados brasileiros e o Distrito Federal

- *Ferrovía Transnordestina Logística S.A. - FTL*
- *Estrada de Ferro Carajás S.A. - EFC*
- *Ferrovía Norte-Sul - FNS*
- *Estrada de Ferro Vitória à Minas - EFVM*
- *Ferrovía Centro Atlântica - FCA*
- *MRS Logística S.A.*
- *América Latina Logística Malha Sul S.A. - ALLMS*
- *Ferrovía Tereza Cristina S.A. - FTC*
- *Estrada de Ferro Paraná Oeste S.A. - FERROESTE*
- *América Latina Logística Malha Norte S.A. - ALLMN*
- *América Latina Logística Malha Oeste S.A. - ALLMO*
- *América Latina Logística Malha Paulista S.A. - ALLMP*
- - - - - *Em construção*

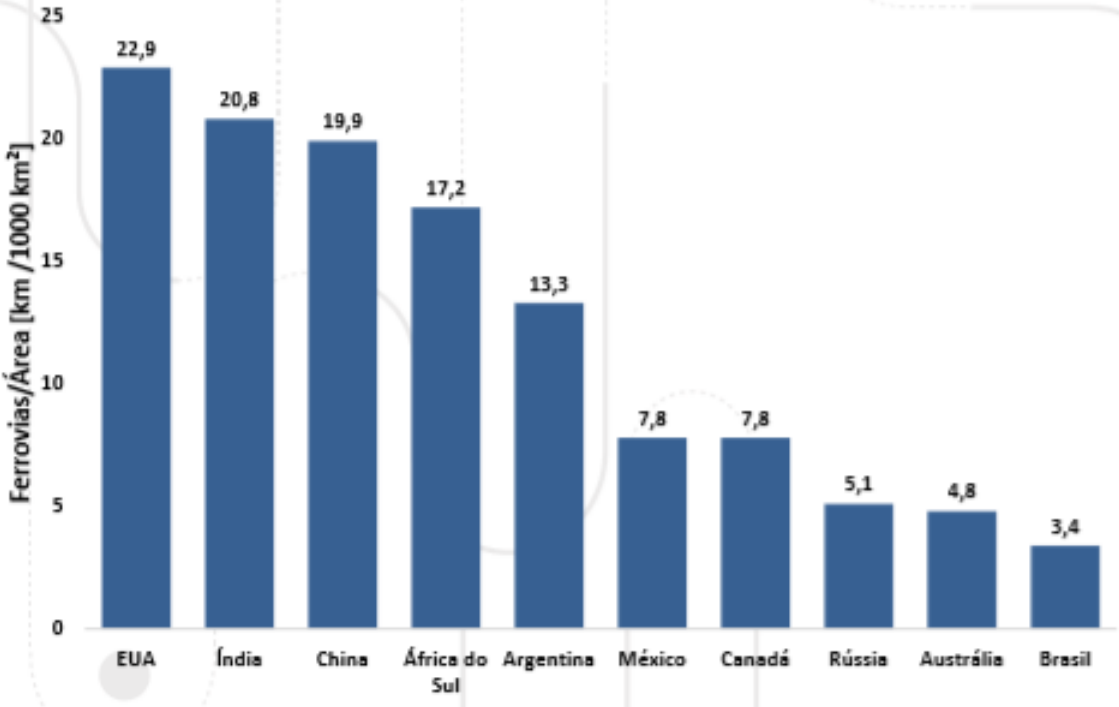


Mapa das ferrovias concedidas

30,576 km of lines, predominantly dedicated to freight subdivided into 12 regional rail systems...

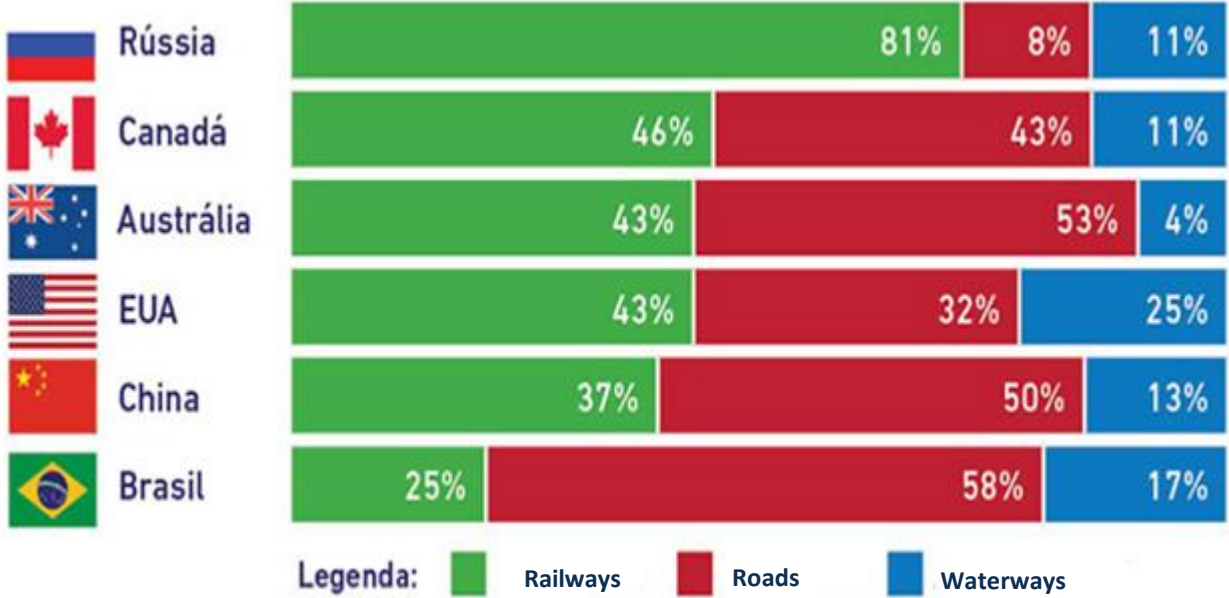
Brazil has had a limited expansion of their rail network in recent years and the freight railway sector still has a small share in the transportation matrix...

Railway network in terms of line density in countries



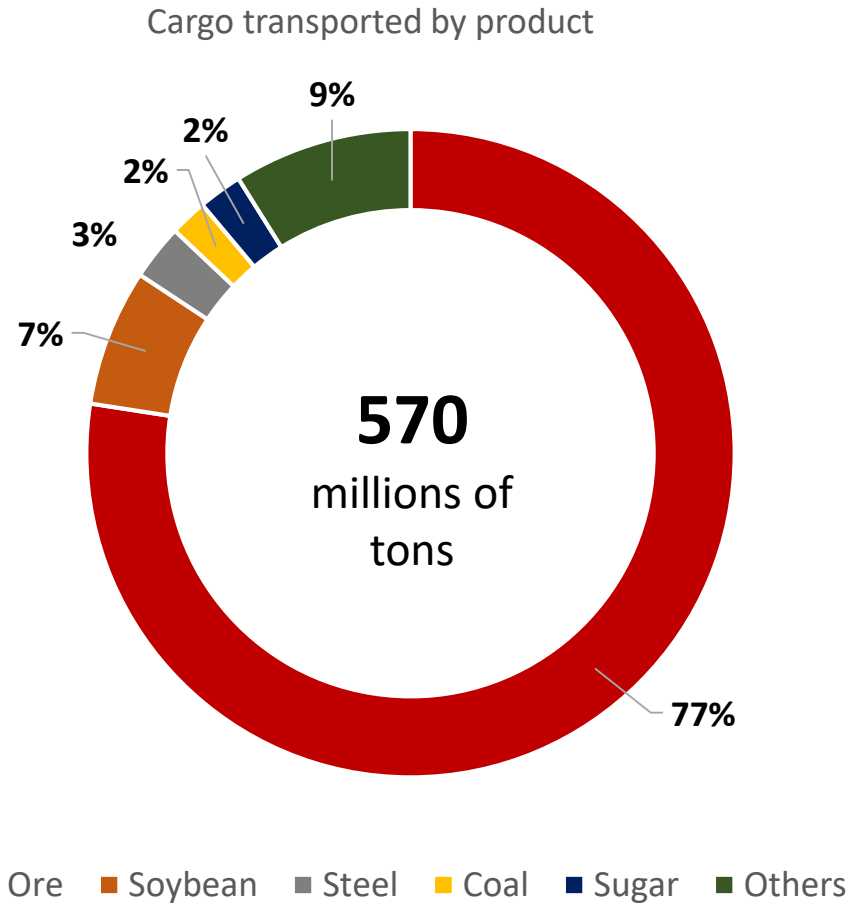
Source: Associação Nacional dos Transportes Ferroviários (ANTF)

Freight transportation Matrix

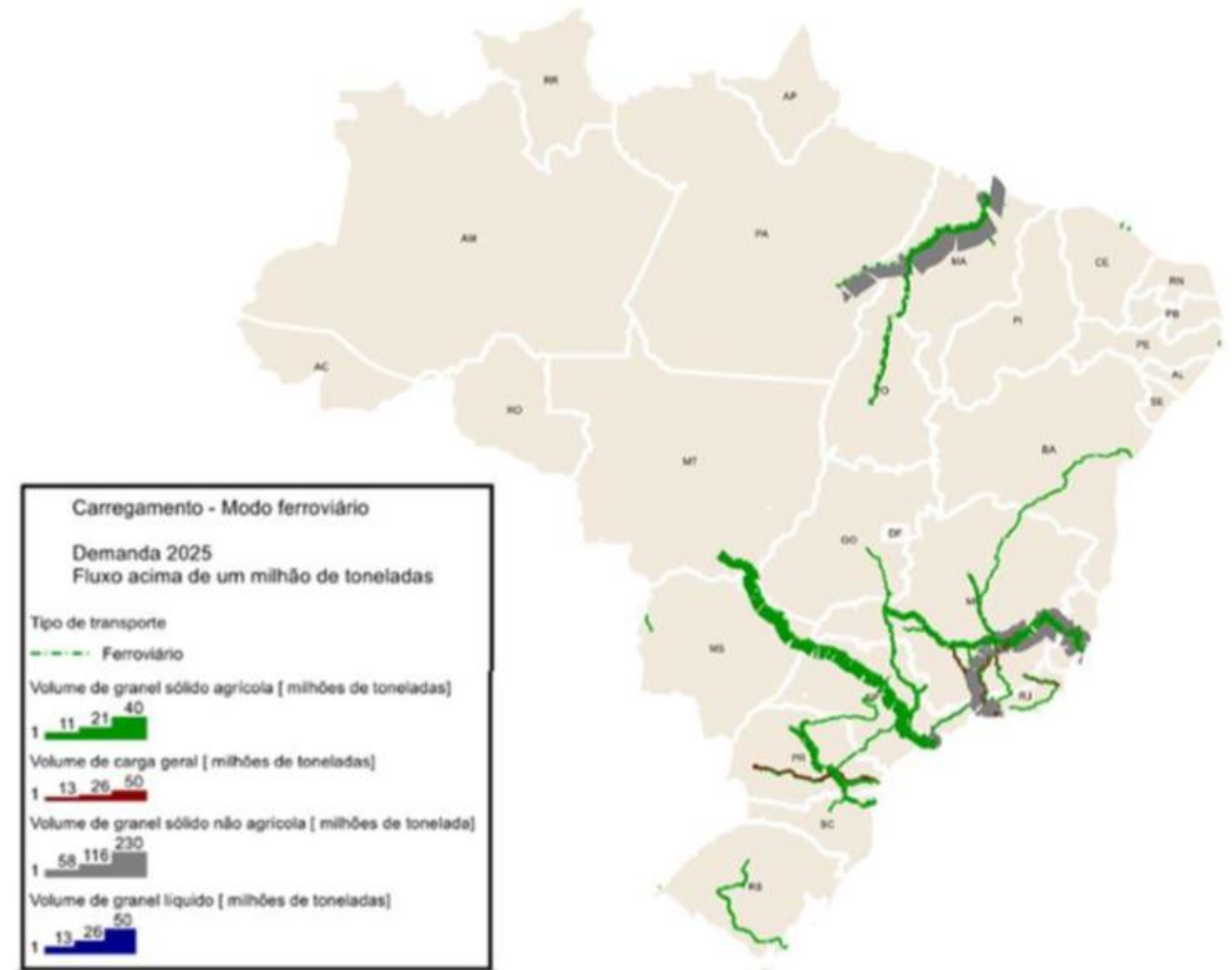


Source: Brazil National Logistics Plan (2014)

The Brazilian rail sector focuses mainly on commodities for export, especially the iron ore...

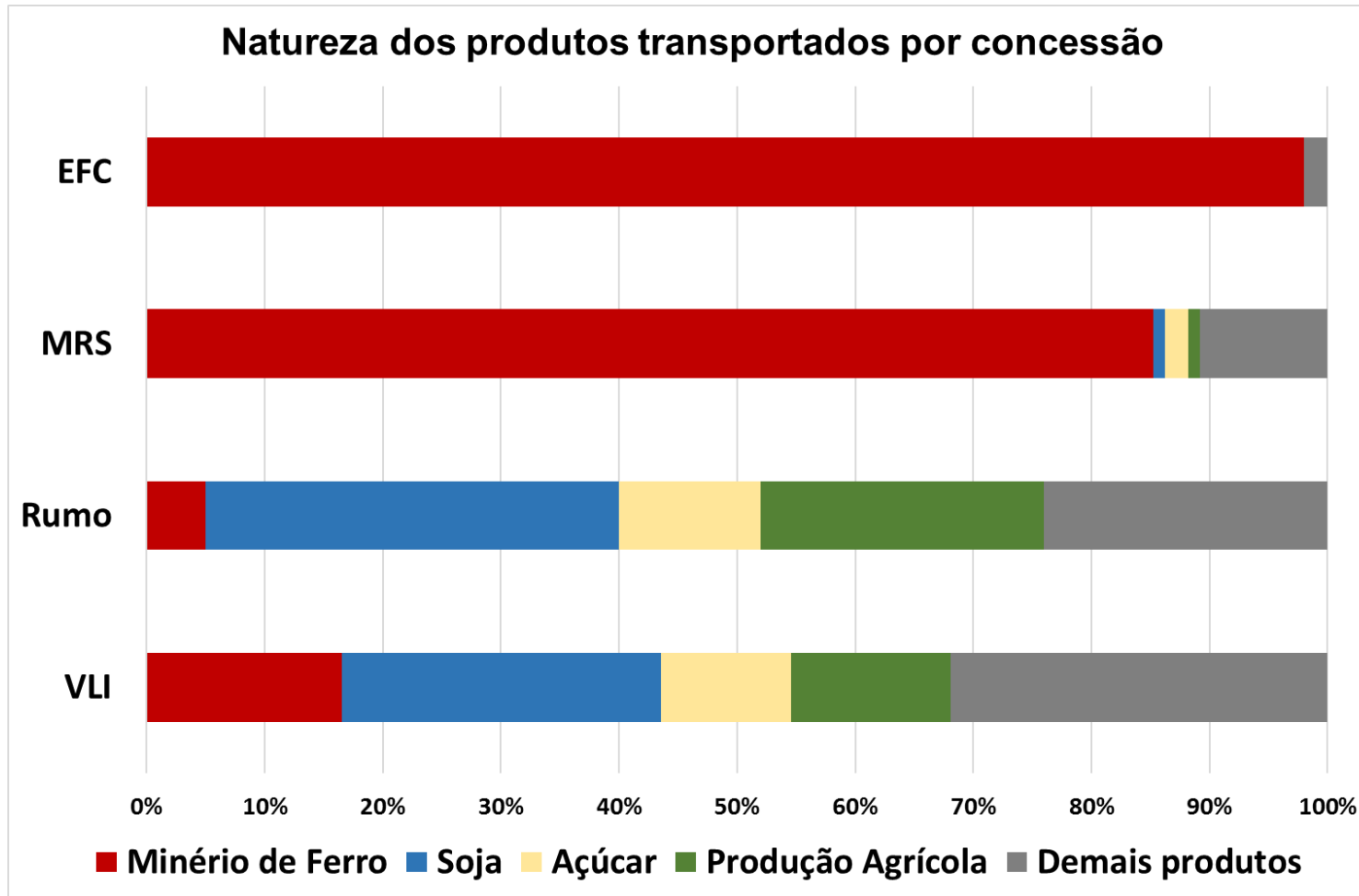


Source: In Land Transport Agency (Brazilian Rail Regulatory Authority)



Source: Empresa de Planejamento e Logística (EPL)

Main concessionaires prioritize a single product: their own cargo



Almost fully vertical integrated operators

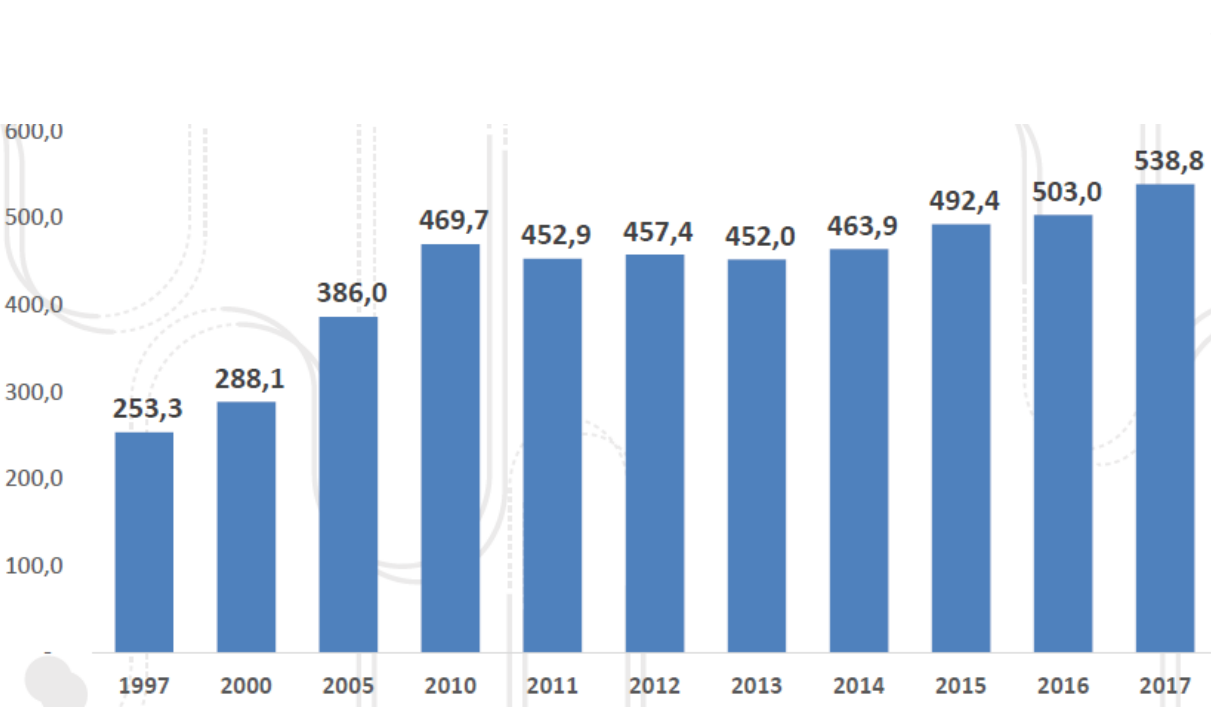


More diverse cargo: more geared towards a logistics operator

Since denationalization, the Brazilian freight rail system has received increased investment flows and has improved operational performance...

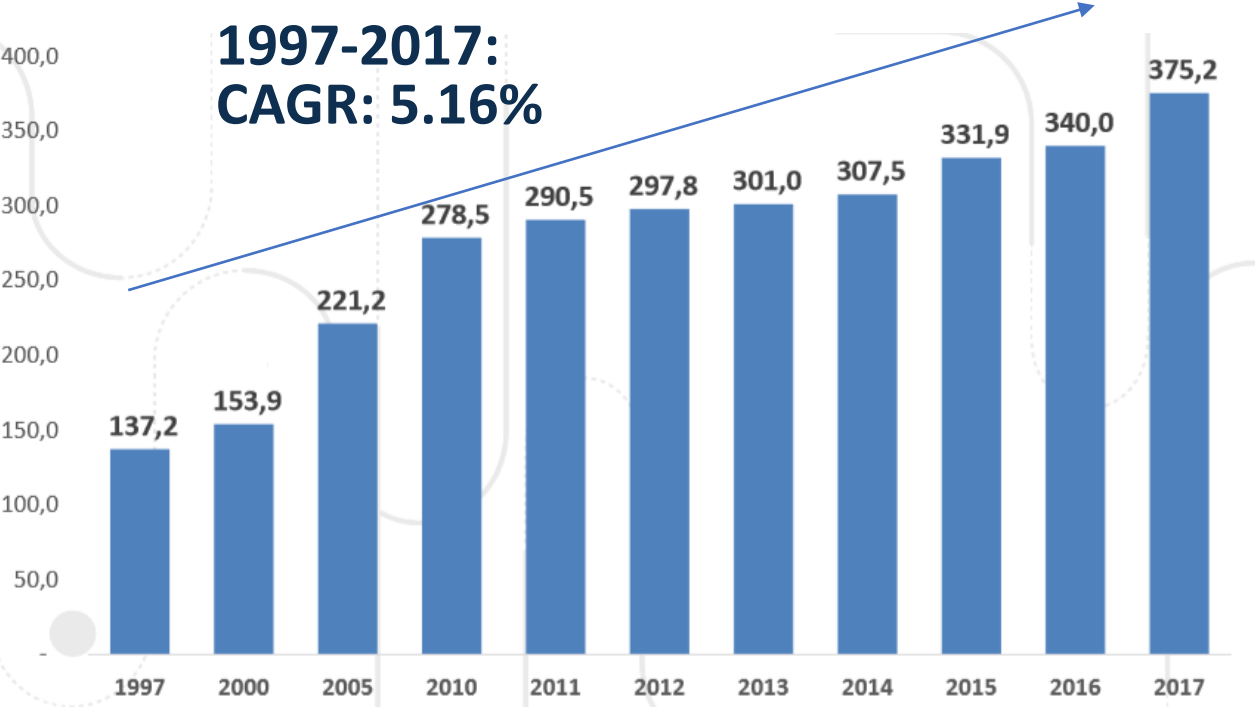


Private Investment in railways (R\$ M)



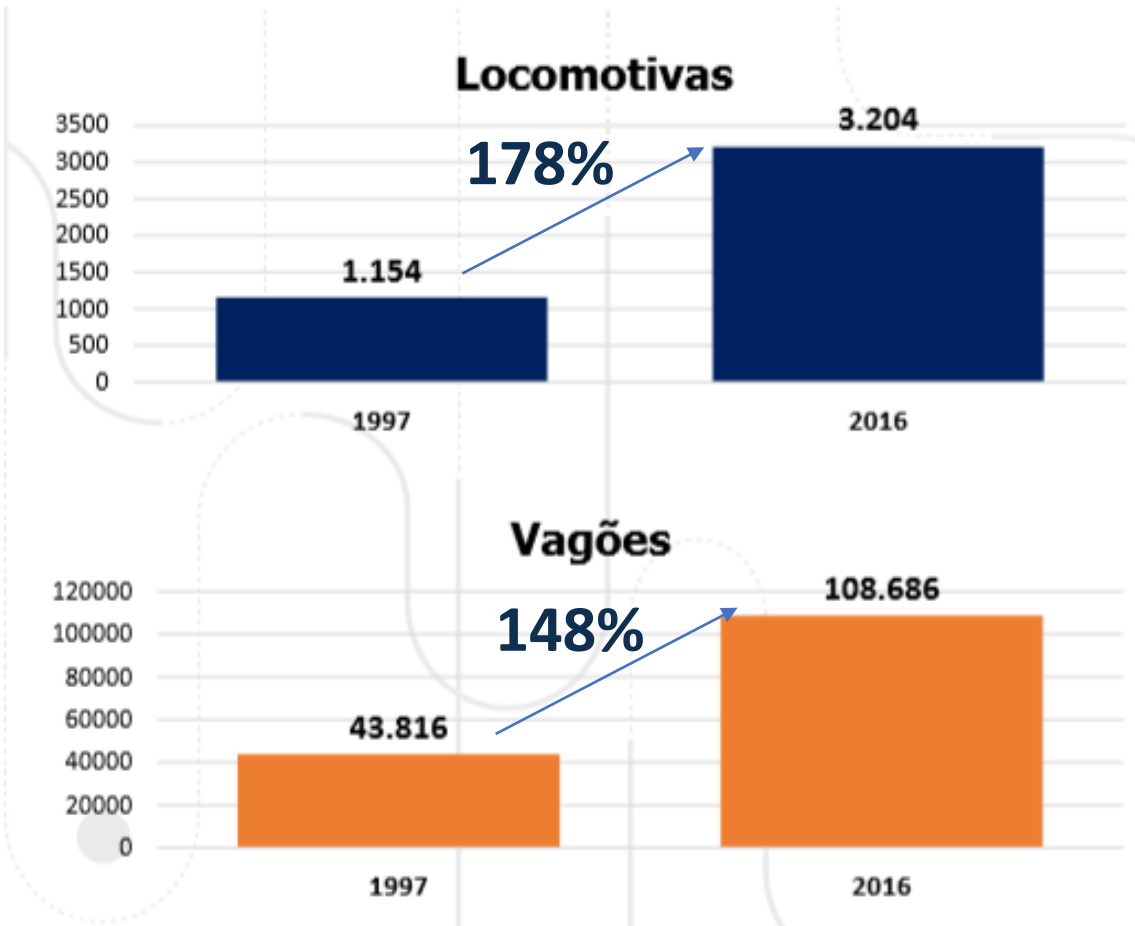
Source: ANTF

Brazilian Rail Freight Production Evolution (Billion TKU)



Source: ANTT

Most of the investment in the sector went into rolling stock (wagons and locomotives). However, despite the recent fleet renewal, a significant part of the total fleet is still old...



Source: Associação Nacional dos Transportes Ferroviários (ANTF)

33% -> more than 40 years of use

29% -> more than 40 years of use

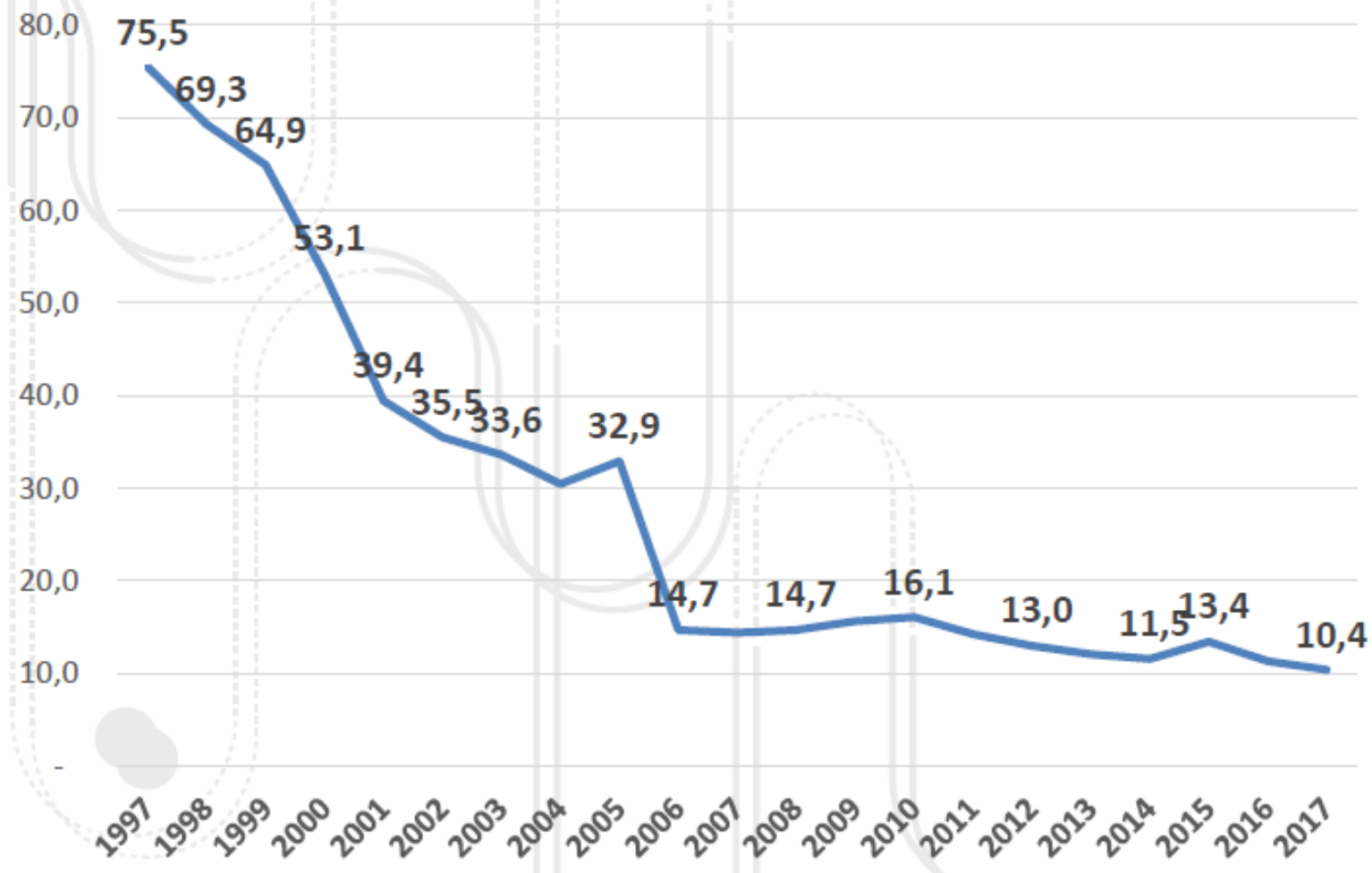
Source: Banco Nacional de Desenvolvimento Econômico e Social (BNDES)

Average Age of the Wagon Fleet

- 1990 - > 42 years
- 2010 - > 25 years
- 2016 - > 22 years

Source: Associação Nacional dos Transportes Ferroviários (ANTF)

A Drastic Reduction of Accidents

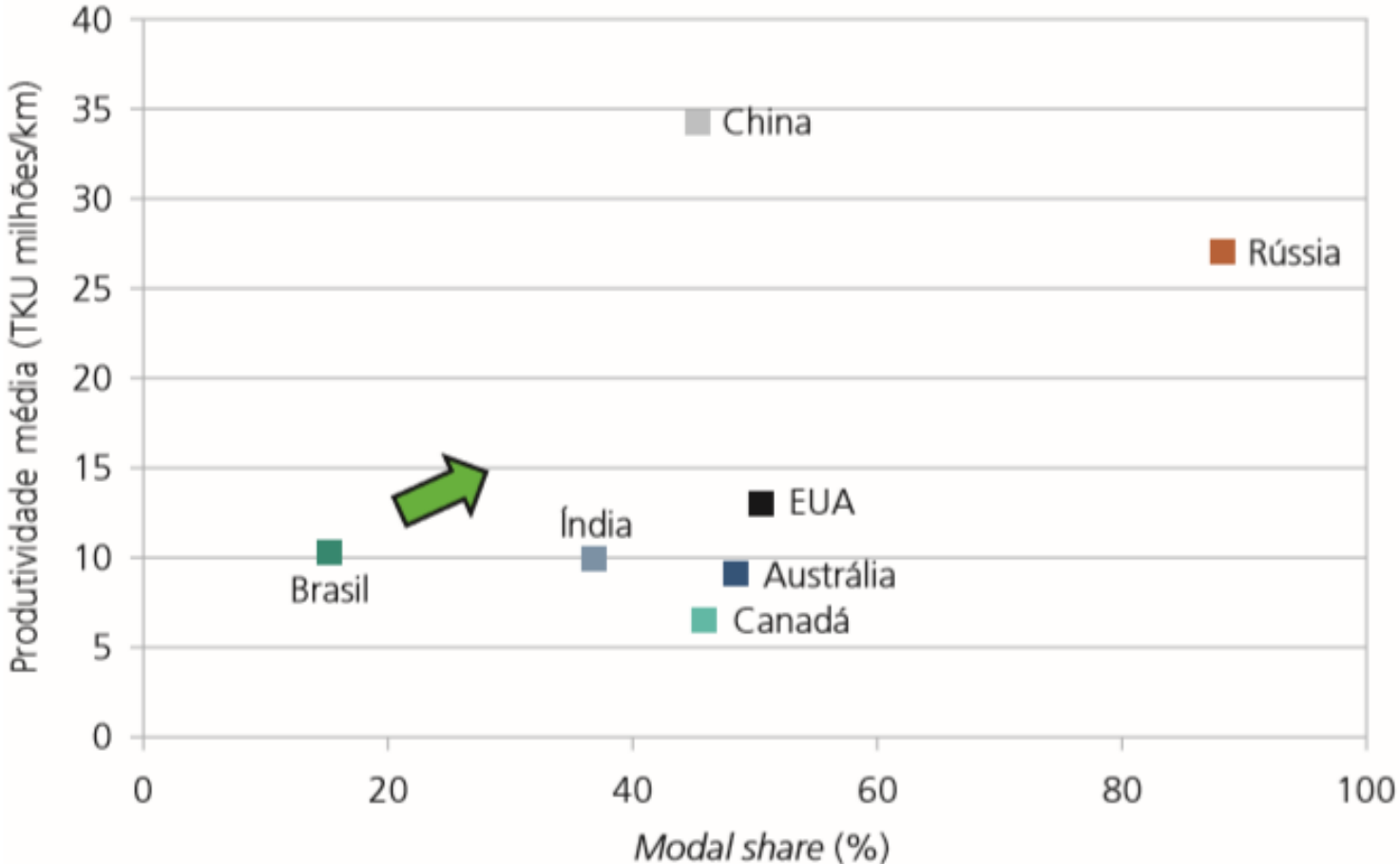


**86% reduction of
rail accidents
from 1997**

Source: ANTF

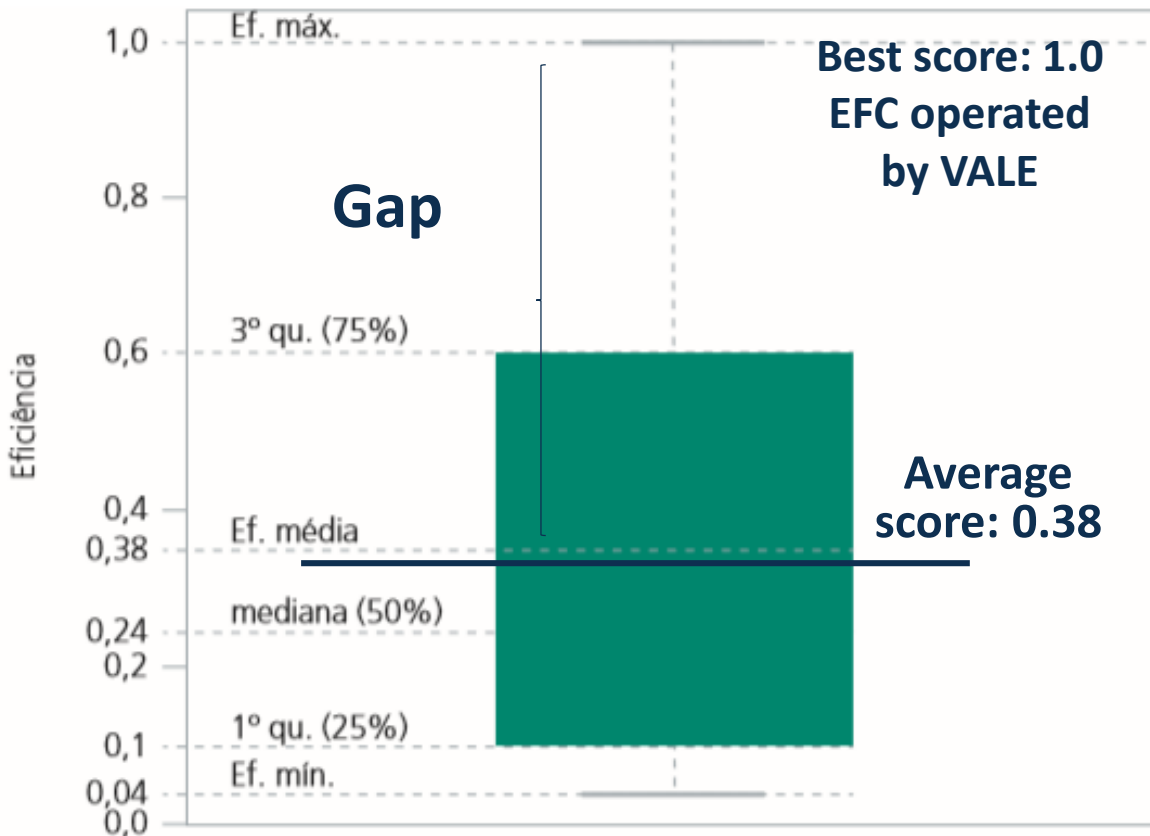
Despite the low modal share, the Brazilian productivity remains similar to its peers...

Average productivity vs modal share

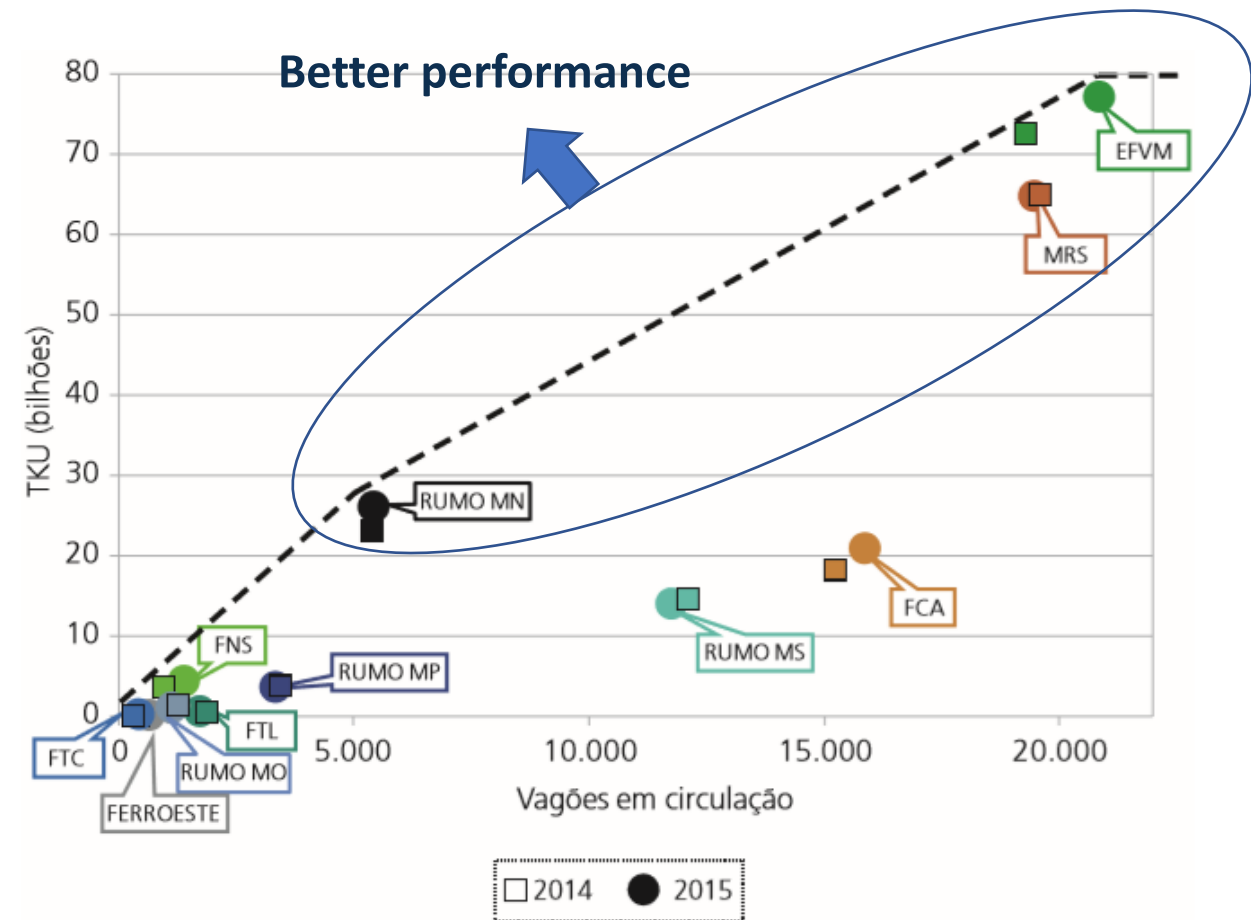


Yet, in terms of efficiency, the sector has a high discrepancy between concessionaires...

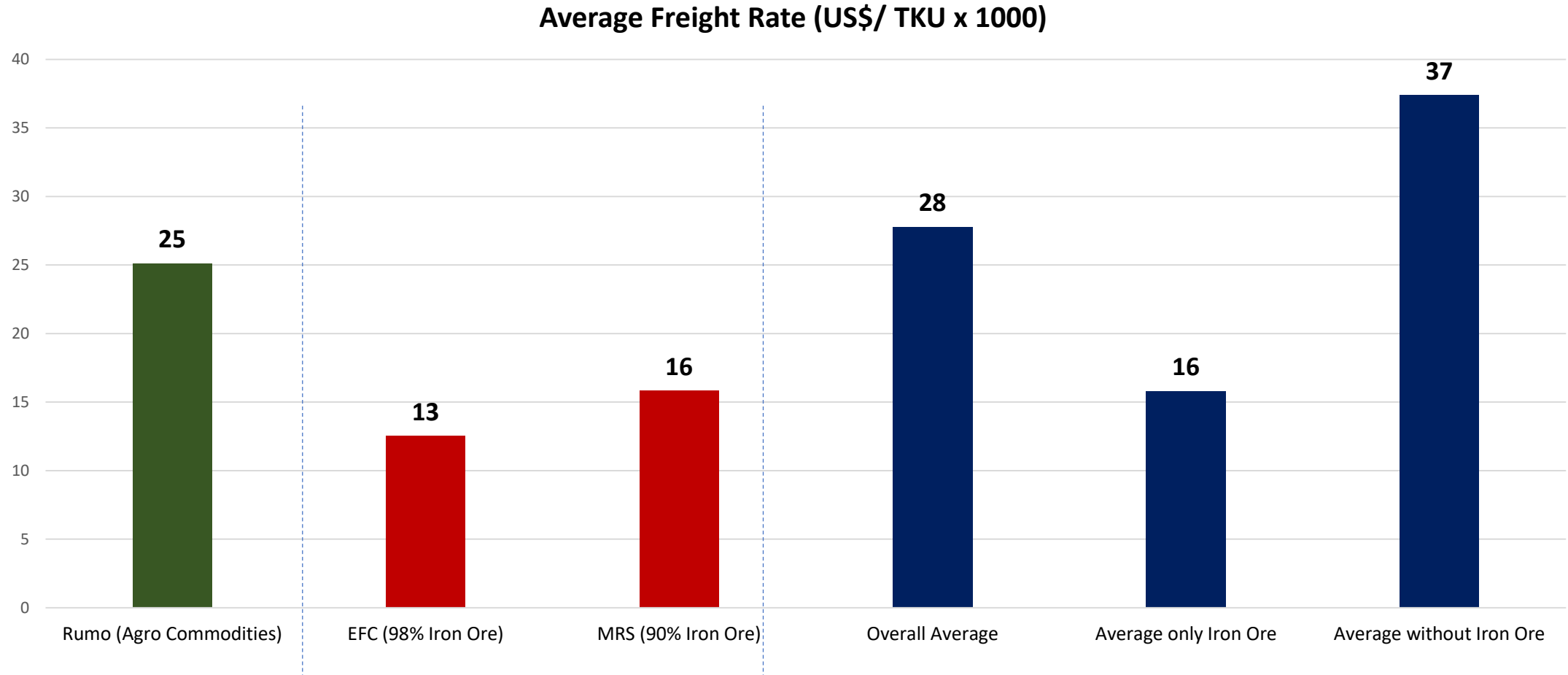
Boxplot of the efficiency scores of the Brazilian railways:
Variables: number of wagons, number of staff (inputs), production (output)



Production vs number of wagons (without EFC)

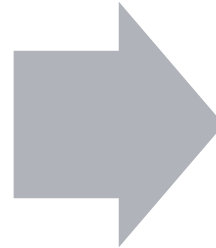


The estimated average freight price in Brazil is 28 US\$ / TKU x 1000, varying according to the product....



The challenges at a glance: the growth and attractiveness of railways as a mode is limited because of a network structured along not fully compatible regional monopolies...

- 12 separated regionalized concessions
- Different gauges (from 1.00 m to 1.60 m)
- Isolated commodity export corridors
- Low geographic coverage, particularly from the mains agricultural production areas to the ports

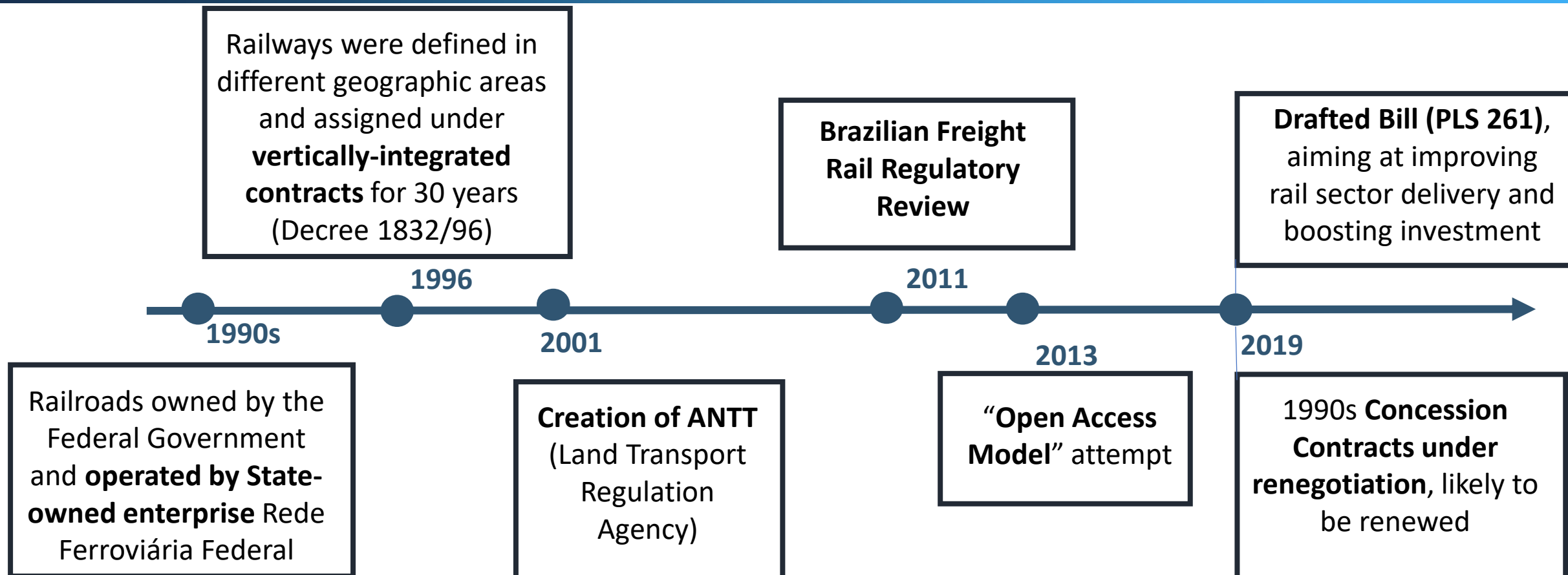


- Low integration of the system
- Poor connectivity and accessibility
- Lack of intermodality
- Limitations to competition in the market
- Sub-utilization of the overall network
- Low rail interoperability

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Current Rail Regulatory Situation

The regulatory timeline, from the 1990s until today ...



Focusing on strengthening regulatory governance, ANTT published in 2011 the Brazilian Freight Regulatory Review

The Regulatory Framework was composed of three resolutions: 3,694 / 11, 3,695 / 11 and 3,696 / 11, focusing on **making more clear the existing rules, setting the minimal operational requirements and bringing the guidelines governing shippers and railway rights:**

1. Access Rules:

- The “open access” can not be denied by the concessionaire accessed and depends on the capacity
- If additional investments are required for the access, the operator can bear the costs
- Creation of Specific Operational Contracts for the concessionaires sharing the infrastructure

2. Qualification of production targets:

- Definition of production targets by stretch
- Mandatory provision of information about idle capacity
- Objective and homogeneous safety parameters

3. User Rights

- Guidelines governing shippers and railway rights, including more clear rules about the tariff and eventual arbitration
- Definition of the exclusive service (only by the concessionaires) and accessory operations
- The shipper can invest in the concession to enable the transportation of own cargo

The main features of the 1990s contracts and the resulting issues...

- Features

- **Right to exploit the rail network for 30 years** (possibility to be renewed for an additional period of 30 years term)
- **Tariffs** follow a **price cap regime** (depending on the product and the distance) agreed under the concession contract and revised by ANTT.
- **Access Rules:** concessionaires are required to operate in mutual traffic or, if not possible, to allow the access to other operators
- **Production targets** for the whole railway network and not divided by stretches

- Issues

- **Tariffs:** Defined based on the former SOE's operating costs, only in 2012 the first economic-financial review was carried out , with an average 30% reduction on tariff caps.
- **Access Rules:** Albeit allowed by law, the rules were not clear enough and did not have the required enforcement. In addition, there was an asymmetry of information about the real idle capacity.
- **Production targets** not divided by stretched led to the sub-utilization of some stretches
- **Investments** not stimulated: any investments requirements included and private sector investments were not reversible at the end of the concession

- **Prices negotiated** between shippers and rail operators
- Prices follow a **price cap regime** (depending on the product and the distance) agreed under the concession contract and revised from time to time by ANTT.
- Accessory services (loading, unloading, trans-board, weighting, and maneuvering) not regulated and subject to negotiation between concessionaires and clients.
- Tariff caps computed per product and including a fixed part and a variable part, per category of distance

Tabela	Parcela Fixa		Parcela Variável				Unidade
	Valor	Unidade	Faixa 1	Faixa 2	Faixa 3	Faixa 4	
			0-300 km	301-600 km	601-900 km	Acima 900 km	
Acúcar	10,52	R\$/T	0,1248	0,1153	0,1059	0,0965	R\$/T.KM
Areia	10,52	R\$/T	0,0524	0,0485	0,0445	0,0406	R\$/T.KM
Bauxita	10,52	R\$/T	0,0953	0,0880	0,0810	0,0738	R\$/T.KM
Carvão Mineral	3,86	R\$/T	0,1379	0,1276	0,1172	0,1069	R\$/T.KM
Celulose	10,52	R\$/T	0,2289	0,2117	0,1946	0,1773	R\$/T.KM

- **Tariffs:** Defined based on the former SOE's operating costs, only in 2012 the first economic-financial review was carried out , with an average 30% reduction on tariff caps.

Access Regulation (since 2011: Resolution 3.695)

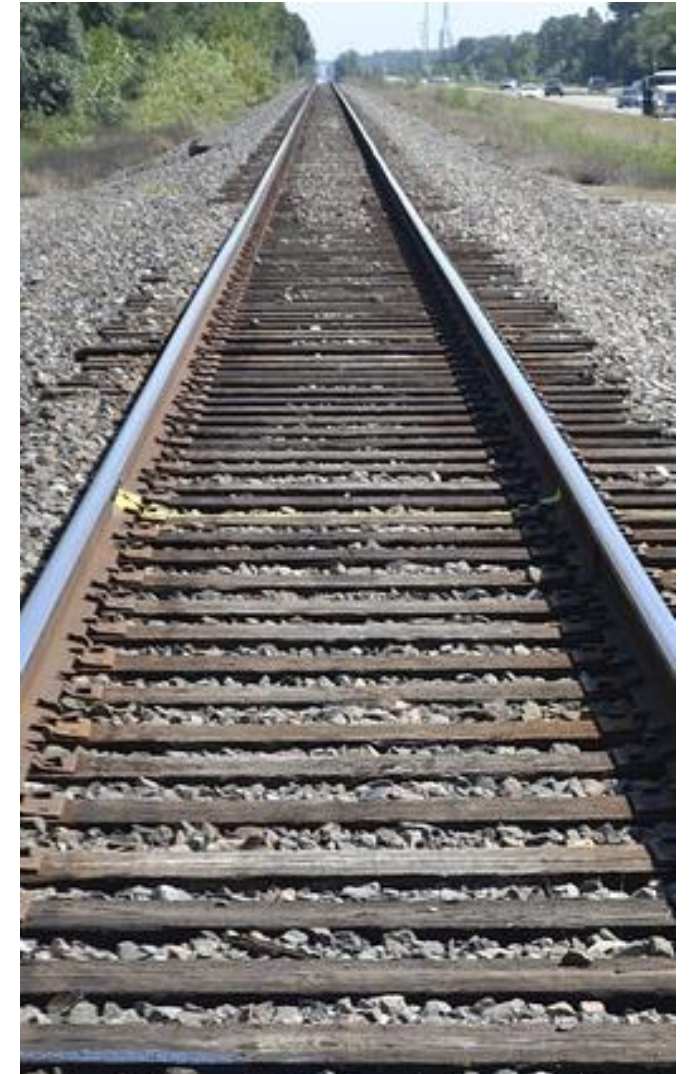
- Obligation to provide access to third-party operators / concessionaires included in the 1996 Rail Transport regulation
- Two regimes:
 - Mutual traffic regime (“trafego mutuo”) → *Default regime*
 - Right of way (“Diretos de passagem”)
- Access facilitated by mandatory publication of a *Network Declaration*
- Access agreement managed by a Specific Operational Contract (COE) freely negotiated and signed between the two parties – including on price.
- ANTT may regulate mutual access tariffs
- Access conditioned to the **available capacity** (“capacidade ociosa”) criterion
- Enables capacity investments financed by one concessionaire onto another concessionaire network
- Recourse possible to ANTT in case of dispute

- Infrastructure characteristics
- Train configuration
- Operational features

- Installed capacity
- Available capacity

The “Dependent User”

- Aiming at providing protection to shippers depending on rail transport to ship their production
- 32 registered “dependent users” in Brasil (2018)
- ANTT evaluated if dependency is justified
- If so, concessionaire(s) are required to propose a transport contract, including a take-or-pay clause
- If not possible: ANTT arbitrage



3

The aborted Open- Access Model

In 2013, Brazil attempted to adopt the “Open Access Model” for the greenfield rail project...

Concession of the exploitation of the infrastructure

Federal Government

VALEC
Capacity Allocation

Infrastructure
New Unbundled Railways

The whole capacity provision
Capacity availability rate
Capacity provision

Tariff

Operation
Vertical Concessionaires or Independent Rail Operators

Fee

- **Public company** would be in charge to guarantee of the whole **rail capacity** from **private infrastructure managers** and sell it to **private operators**
- **Potential benefits:**
 - **Attract private investor** through the public assumption of demand risks
 - **Foster the competition** in the rail market , through the neutral access in those new unbundled railways

But, in 2015, the proposal was abandoned...

- **Strong resistance from incumbent concessionaires**, which concession contracts just reaching their mid-term.
- **Uncertainty regarding VALEC's** (SOE) financial capacity to honor long-term purchase contracts due to fiscal hurdles
- **Lack of clarity** of how unbundled railways would coexist and interact with vertically-integrated concessions

And more substantially about the efficiency of the model:

- **Economics:** challenges to implement a “Ramsey-like” pricing principle
- **Operations:** rail production optimization, more complex and less flexible contracts

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Latest Concession
Case: North-South
Railway

Latest case: the North-South Railway (1)

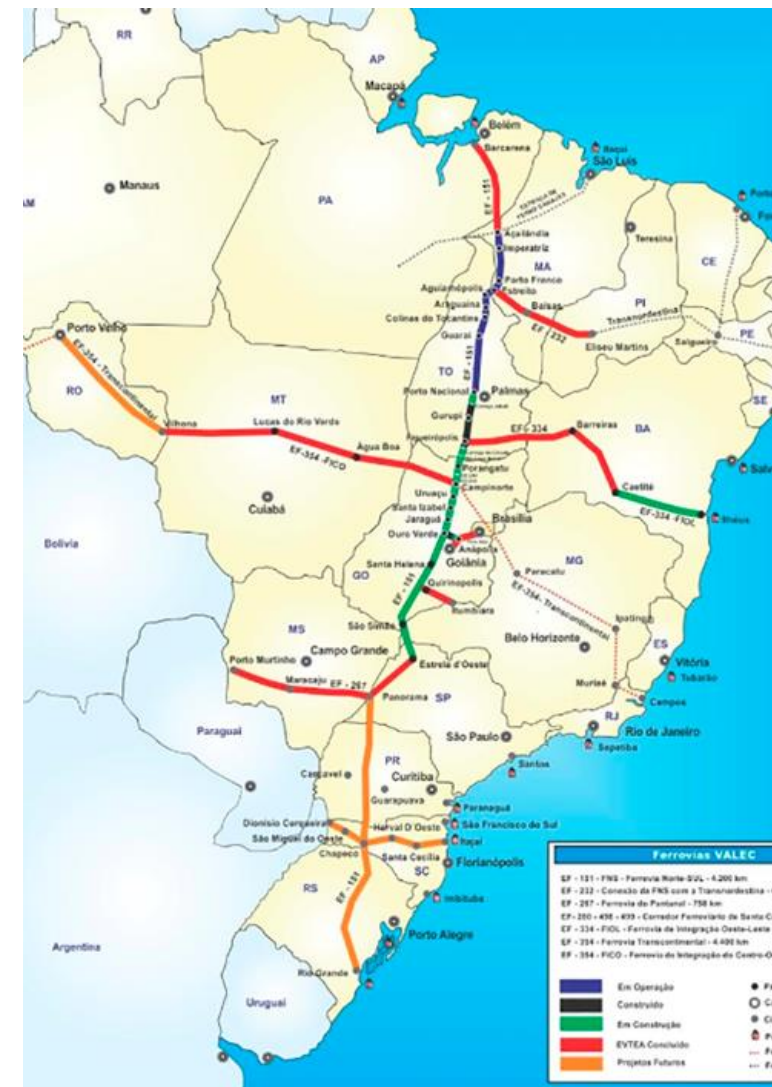
- Some enhanced features
 - Granted trackage rights in/out neighboring concessions

Tabela 1: Volumes assegurados

Descrição	Unidade	2019	2020	2021	2022	2023
Direito de passagem da FNS na malha da EFC	TU 10 ⁶	0,48	0,62	0,78	0,94	1,12
Pares de trens/dia	Unid	0,20	0,26	0,33	0,40	0,48

- Transit time
- Price cap for interchange traffic

10. A EFC deverá respeitar o teto tarifário estipulado pela ANTT, cuja tarifa máxima de referência para o direito de passagem corresponde o montante de **9,54 R\$/t** (Preços de dez/2016).



Latest case: the North-South Railway (2)

- Investment plan
 - Mandatory investments (\$150M)
 - Triggered investments, if saturation > 90%

- Technical specs infrastructure

- Operation KPIs

- Accident rate
- Average commercial speed
- Locomotives age: < 40

Etapa do Contrato de Subconcessão	IAFG - Índice de Acidentes Ferroviários Graves
Data de Assunção até o 5º ano	< ou igual a 2,65
A partir do 5º ano	< ou igual a 2,15

Etapa do Contrato de Subconcessão	IVMP (km/h)
Data de Assunção até o 5º ano	> ou igual a 40,0
A partir do 5º ano	> ou igual a 45,0

Latest case: the North-South Railways (3)

➤ Economic regulation

- Mini / maxi rates dispersion: $(\mu_{i,t} - 2,6 * \sigma_{i,t}) \leq x_{i,t} \leq (\mu_{i,t} + 2,6 * \sigma_{i,t})$

Average
Rate/Reference

Standard dev.
Rate/Reference

- Reference rates table

$$T_{Ref} = PF + Dist * PV$$

- Specific reference rate for interchange

Mercadoria	Parcela Fixa (R\$/unidade)		Parcela Variável (R\$/unidade.km)	
	Valor	Unidade	Valor	Unidade
Adbos e Fertilizantes	45,41	R\$/t	0,1121	R\$/t.km
Cimento, Cal e Clínquer	28,31	R\$/t	0,1104	R\$/t.km
Açúcar	22,59	R\$/t	0,1682	R\$/t.km
Óleo Vegetal	41,50	R\$/t	0,0938	R\$/t.km
Grãos e Farelos	24,17	R\$/t	0,0758	R\$/t.km
Combustíveis	36,64	R\$/m ³	0,3570	R\$/m ³ .km
Algodão	34,13	R\$/t	0,1333	R\$/t.km
Contêiner Vazio de 20 Pés	202,31	R\$/TEU	1,4988	R\$/TEU.km
Contêiner Vazio de 40 Pés	364,16	R\$/TEU	2,6977	R\$/TEU.km
Contêiner Cheio de 20 Pés	282,59	R\$/TEU	2,0928	R\$/TEU.km
Contêiner Cheio de 40 Pés	508,66	R\$/TEU	3,7672	R\$/TEU.km
Demais Produtos	22,43	R\$/t	0,1074	R\$/t.km

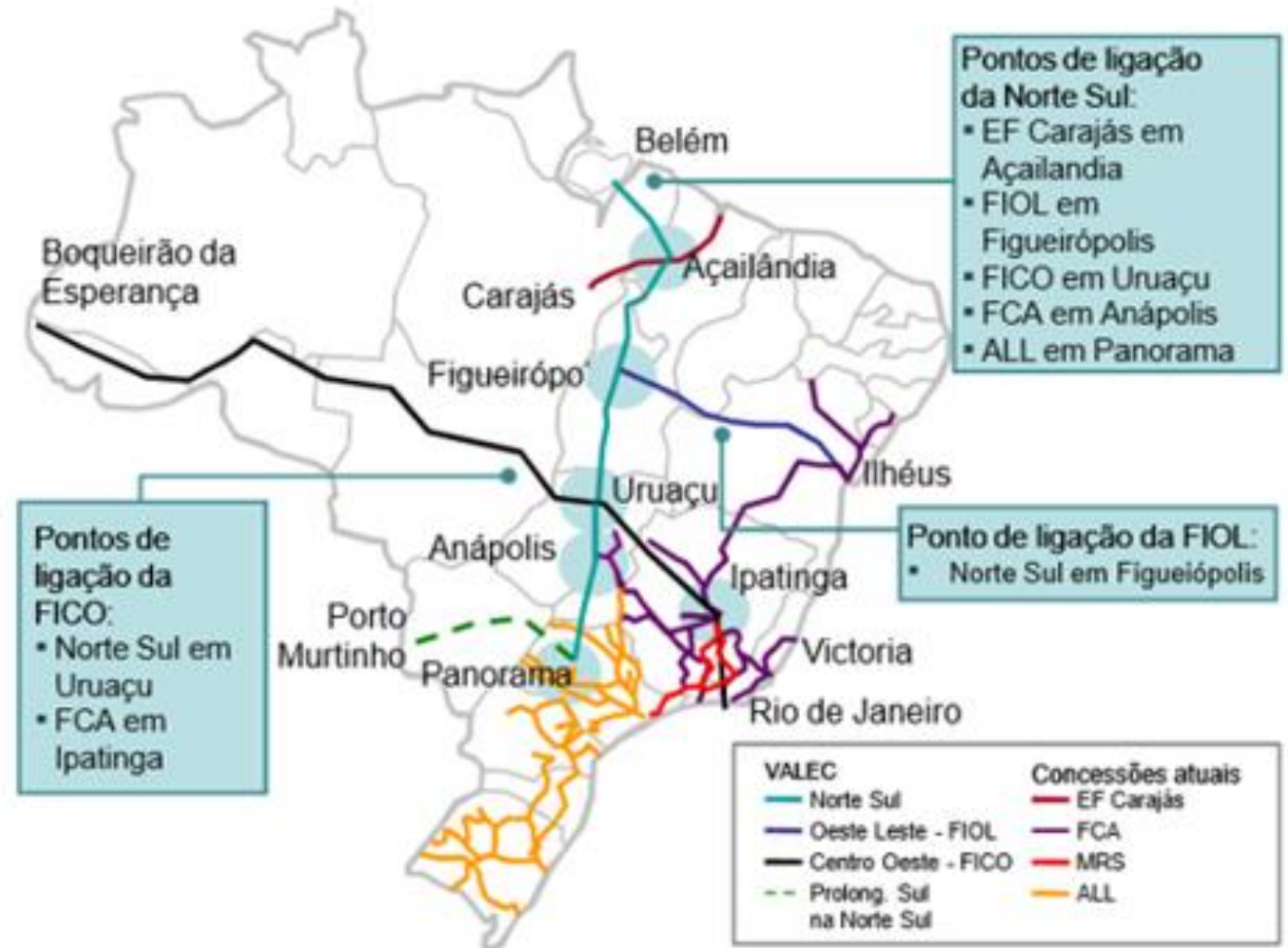
Mercadoria	Parcela Fixa (R\$/unidade)		Parcela Variável (R\$/unidade.km)	
	Valor	Unidade	Valor	Unidade
Todas	-	-	0,0278	R\$/unidade.km

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Cargo Concessions Renegotiation

Rail Infrastructure Gap in Brazil: Rationale for Contracts Renegotiation

- About \$25 billion investment required in rail infrastructure (PIL2015)
- Strong public budget constraints
 - VALEC model not applicable
- Current concessions due to end in 2017, with no investments included



After abandoning the “Open Access”, ANTT has been working on some regulatory adjustment for the new concessions and the extension of contract terms, following the vertically-integrated concession...

- The Law 13.448/ 2017 **establishes conditions for the extension** and re-bidding of contracts in rail sector
- The **concessionaire shall be in compliance** with "safety" and "production" contractual provisions in, respectively, the last 3 and 5 years.
- The extensions will be guided by: **investment obligations** to increase installed capacity, **parameters of quality of services** and **contractual guarantee** of capacity to transport to third parties
- **5 railways, 13,637 km under negotiations**: possibly US\$ 10.5 billion in investment: capacity expansion, new lines, greenfield projects, new technical parameters, reduction of urban interferences

6

Looking ahead: Private Railways

PLS261: Towards Private Railways

- PLS 261 bill establishes three concepts
 - **Private rail operator**
 - **Self-regulation**
 - Bundling rail projects with **land-value capture mechanisms**

- Key concepts introduced:
 - **Private operation** with a legal authorization having no expiration date
 - **Self-regulation:** a non-governmental body assuming certain responsibilities for regulating the industry
 - **Rate liberalization:** private railway has the freedom to set their own rates
 - **Real estate value capture:** provisions for carrying urban development projects, using the land value capture for project finance