

ITU Webinars: Infrastructure sharing best practices for affordable data services

# To share or not to share? The impact of mobile network sharing for operators and consumers

**DATE**  
7/2/2024

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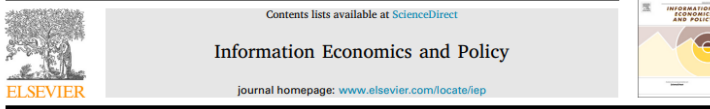
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### To share or not to share? The impact of mobile network sharing for consumers and operators ☆☆☆

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#### ARTICLE INFO

JEL classification:  
D22  
L10  
L20  
L96

Keywords:  
Network sharing  
Infrastructure sharing  
Mobile communications  
Network competition

#### ABSTRACT

This paper assesses the impact of mobile network sharing in Europe during the 2000-2019 period, looking at 140 mobile operators in 29 countries. We find that - consistent with economic theory - network sharing generated significant benefits for operators and consumers, including lower prices and improved network coverage and quality. This was driven by cost reductions, higher returns on investment and increased competition. These effects materialized heterogeneously, with the impact of network sharing depending on the type of sharing, the technology cycle in which it is entered into as well as the market position and size of the operators entering the agreement. This has important implications going forward as it shows that network sharing can play a vital role in the deployment of new 5G networks and that the technological and market specificity of each type of sharing agreement can significantly affect its outcomes.

#### 1. Introduction

The sharing of network infrastructure to deliver mobile services to consumers has become increasingly common, especially in Europe. The majority of network sharing agreements have been led by mobile operators as a way of reducing costs and expanding and improving networks. From an economic perspective, the impacts of such agreements are ambiguous. On the one hand, consumers may benefit from improved coverage, network quality and lower prices if cost reductions are passed through. On the other hand, the potential loss of infrastructure-based competition may result in lower service differentiation and could also reduce incentives to invest.

Despite the relevance of the topic, there is limited empirical evidence that assesses the impact of network sharing on mobile markets and consumers. This contrasts with a much larger body of literature looking at the impact of mergers and new entrants (see for example Anzeroni et al. (2018) and Genakos et al. (2018)). In this paper, we

during the 2000-2019 period. During this time, network sharing not only increased but also evolved as operators entered into different types of sharing, including passive, active and roaming agreements.



The results show that network sharing has generated significant benefits for both mobile operators and consumers. Operators that entered into network sharing agreements were able to reduce prices (proxied by ARPUs) and increase network coverage and quality. This was driven by capex reductions, higher returns on investment - providing operators with both the ability and incentive to invest - and increased competition. In some cases, smaller operators benefited in terms of cost savings that allowed them to reduce prices and improve and expand their networks.

When looking at the impact of different types of sharing, we find that capex savings, profit margin improvements and price reductions were particularly associated with passive sharing. Passive sharing was also linked to increases in 3G coverage, as the majority of passive agreements in Europe were established during the phase of 3G deployments

### New empirical research

- Published very recently on Information Economics and Policy
- Until now, very limited empirical evidence that assesses the impact of network sharing on consumers and markets
- First study to robustly assess the impact of network sharing across a large number of countries and over a long timeframe








### Key economic questions

- On the one hand, consumers may benefit from improved coverage, network quality and lower prices if cost reductions are passed through. 
- On the other hand, the potential loss of infrastructure-based competition may result in lower service differentiation and could also reduce incentives to invest. 

# To share or not to share?

## *Different types of sharing*

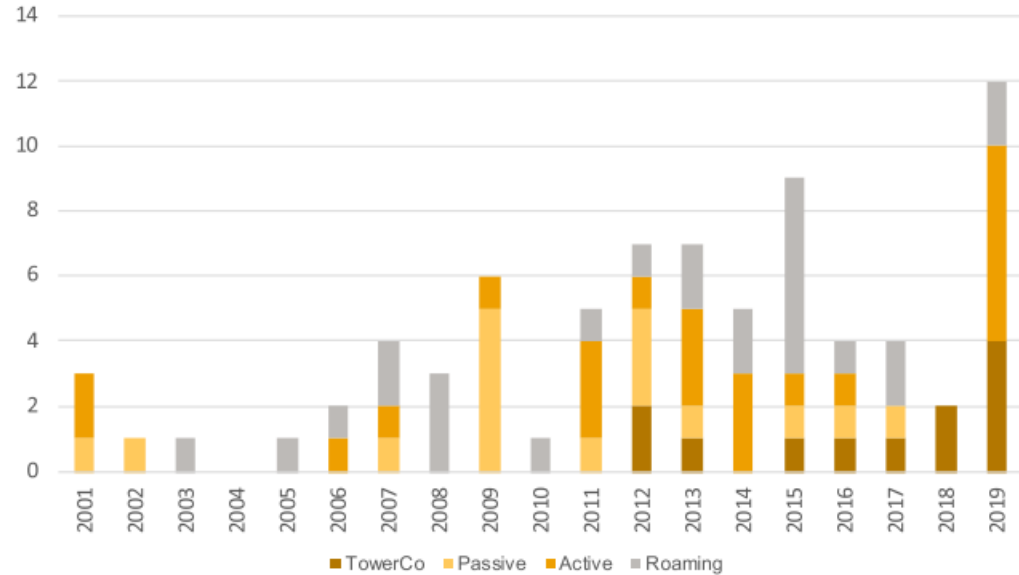
- Sharing agreements in Europe are market driven, not driven by regulation.
- They can help avoid duplication for remote areas and improve efficiency for equipment (masts, antennas), spectrum management, administration, legal and regulatory costs.
- Extent of cost savings a function of technology, market conditions and type of sharing agreement.

Operators in agreement	Type of sharing	Infrastructure and service sharing				
	Passive	 Masts, sites, cabinet, power, and air conditioning				
	Bilateral (1-1)	Active	<table border="1"> <thead> <tr> <th>MOCN</th> <th>MORAN</th> </tr> </thead> <tbody> <tr> <td>             Base station, radio access networks and spectrum         </td> <td>             Base station, antennas and radio network controllers (RNC)         </td> </tr> </tbody> </table>	MOCN	MORAN	 Base station, radio access networks and spectrum
MOCN		MORAN				
 Base station, radio access networks and spectrum	 Base station, antennas and radio network controllers (RNC)					
Multilateral (1-n)	Roaming	 Signal service				
	TowerCo	Mainly passive equipment but expanding to active and services				

# To share or not to share?

*Network sharing deals announced in Europe between 2001 and 2019*

- For the first ten years, network sharing mostly consisted of roaming and passive agreements.
- After 2010, the incidence of network sharing increased but with a different focus.
- In particular, passive agreements gradually subsided as active network sharing (particularly MORAN) and tower companies (TowerCos) began to emerge



# To share or not to share?

*Data used in the study*

## **Panel of data:**

- 140 operators in 29 European countries during the period 2000-2019.

## **Network coverage and mobile connections:**

Used for HHI and market coverage and penetration

## **Financials:**

Investment (CAPEX), earnings before interest, tax, depreciation and amortization (EBITDA)

## **Quality:**

Download speeds, only available from 2011 onwards

## **Prices:**

Proxied by average revenue per user (ARPU)

## **Network sharing agreements:**

Based on public announcements. These include the deal type, the date of commencement and duration.

## **TowerCos:**

We identify sellers (operators) and buyers plus duration

## **Macro data:**

GDP per capita and rural population are sourced from Eurostat.

# To share or not to share?

## Main results

- To assess the impact of network sharing on consumer welfare, we implement a **difference- in-difference (DID) model at the operator-level**.
- Our DID model compares market outcomes between 'treated' operators that enter into a network sharing agreement, and 'non-treated operators' that do not enter into any agreement, everything else being equal.

### Varying windows of treatment for Any Sharing.

VARIABLES	(1) 3G coverage (%)	(2) 4G coverage (%)	(3) Speed DL (MBps)	(4) log of traffic (GBs)	(5) ARPU (Euros)	(6) EBITDA	(7) CAPEX normalized	(8) HHI
Unrestricted	0.002 (0.005)	0.029** (0.012)	1.961*** (0.486)	0.279*** (0.057)	0.177 (0.182)	0.012* (0.007)	0.083 (5.529)	-60.543*** (11.938)
All pre - 3 years post	0.008 (0.007)	0.049*** (0.018)	1.245* (0.647)	0.158* (0.082)	0.122 (0.300)	0.027*** (0.010)	-21.036** (8.178)	-95.459*** (16.346)
5 years pre - 2 years post	0.016** (0.007)	0.056*** (0.019)	0.945 (0.682)	0.261*** (0.074)	-0.544* (0.316)	0.025** (0.011)	-23.167** (8.990)	-100.000*** (17.422)
5 years pre - 3 years post	0.015** (0.007)	0.052*** (0.018)	1.500** (0.651)	0.328*** (0.071)	-0.648** (0.280)	0.027*** (0.010)	-21.204** (8.389)	-90.007*** (16.436)
5 years pre - 4 years post	0.013* (0.007)	0.050*** (0.018)	1.607** (0.651)	0.385*** (0.070)	-0.670** (0.261)	0.029*** (0.010)	-20.814*** (7.997)	-86.472*** (16.036)

Standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

All results include Operator and Year FEs. The testing period is limited between 5 years before the agreement and 2 years after.

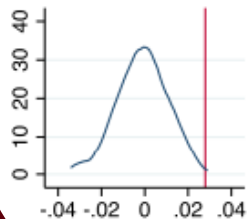


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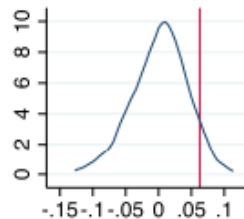
*Main results*

## Passive sharing

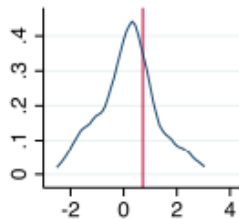
3G Coverage



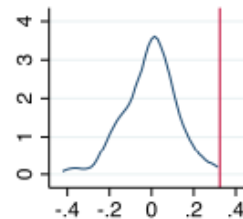
4G Coverage



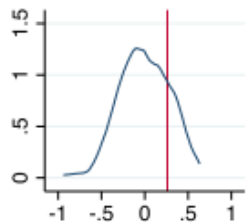
Download Speed



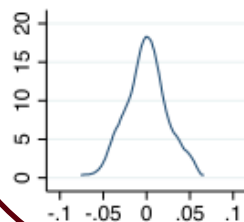
Traffic



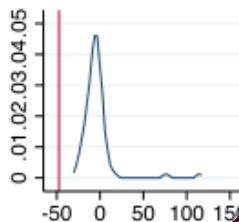
ARPU



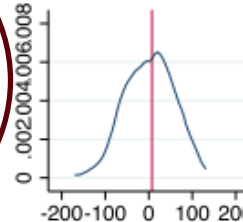
EBITDA



CAPEX



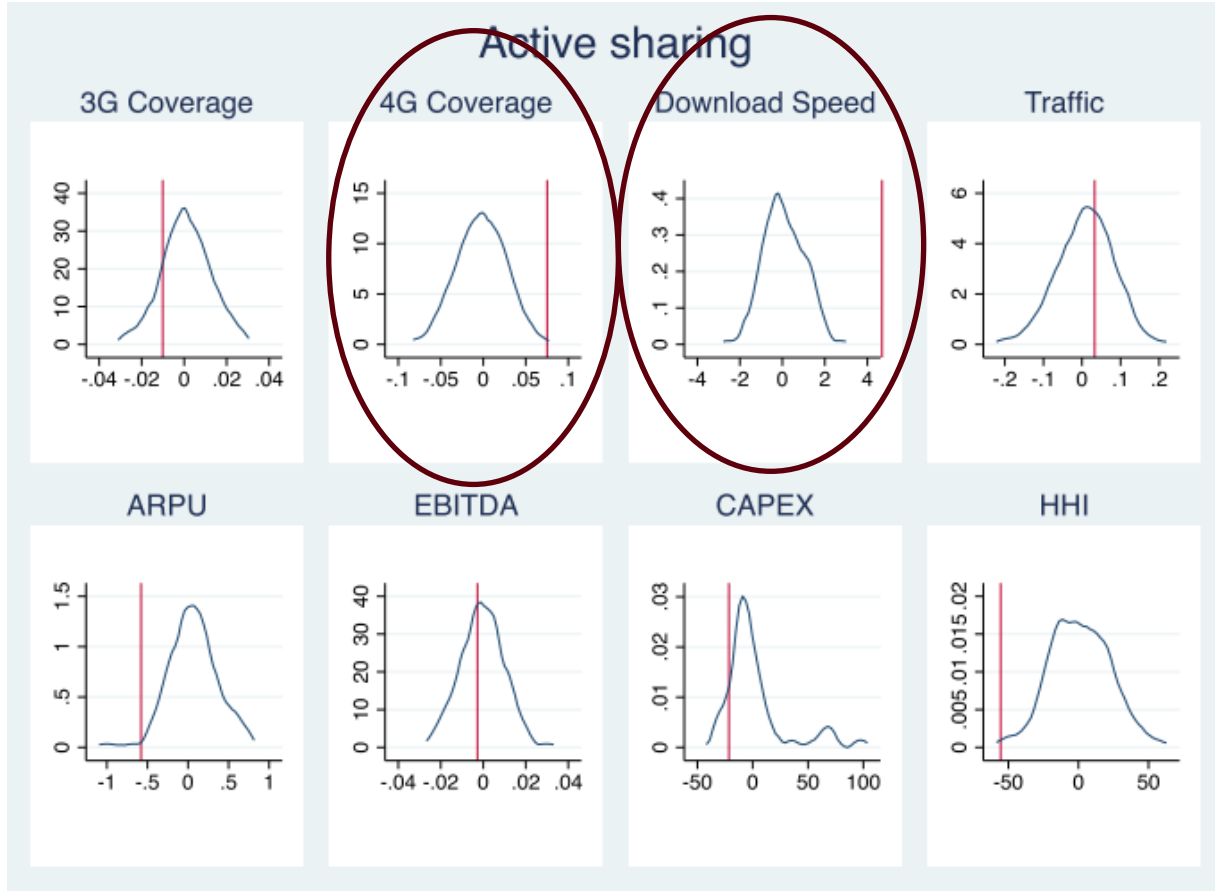
HHI





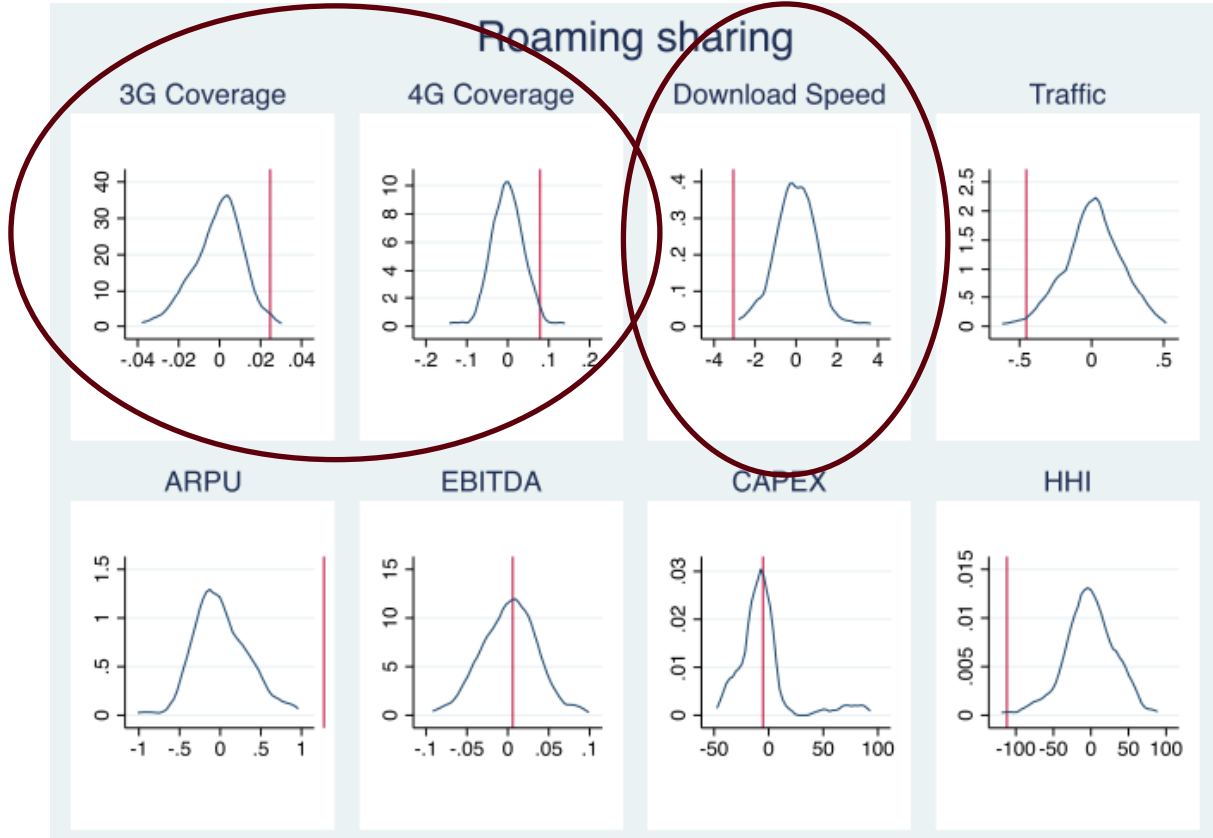
# To share or not to share?

*Main results*



# To share or not to share?

*Main results*

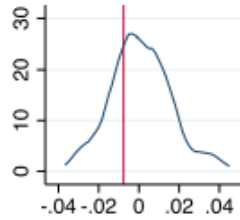


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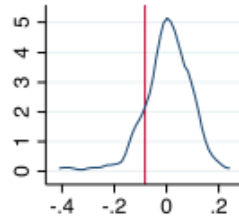
*Main results*

## TowerCo sharing

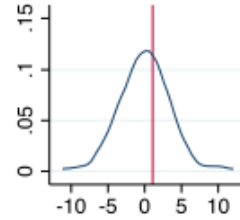
3G Coverage



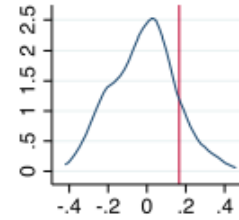
4G Coverage



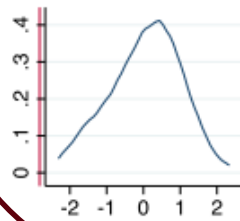
Download Speed



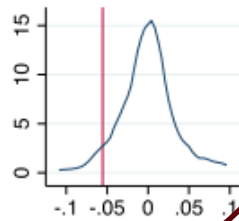
Traffic



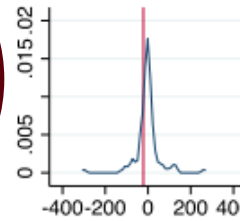
ARPU



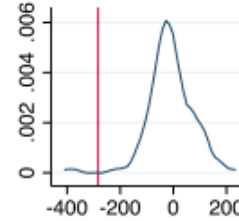
EBITDA



CAPEX



HHI



### Main findings

- Positive consumer outcomes – reduced prices (proxied by ARPUs) and increased network coverage and quality.
- Positive industry outcomes - CAPEX reductions and higher returns on investment
- Smaller operators tended to benefit the most in terms of cost savings.
- Heterogenous results across different types of sharing

### Policy implications

- Network sharing is a viable option to extend coverage...
- ...while reducing the costs involved in infrastructure duplication.
- This should be considered by regulators and competition authorities that are reviewing new and deeper forms of infrastructure sharing during the 5G era

### Research gaps

- Impact of TowerCos requires further exploration
- The assessment of impact on consumer prices would benefit from better and more comprehensive data on mobile pricing
- The incidence and intensity of network sharing can vary significantly within countries depending on geography and the specifics of each agreement



# THANKS

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GSMA