

# Regulatory challenges of Next Generation Access Networks in telecommunications

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**Discussion**

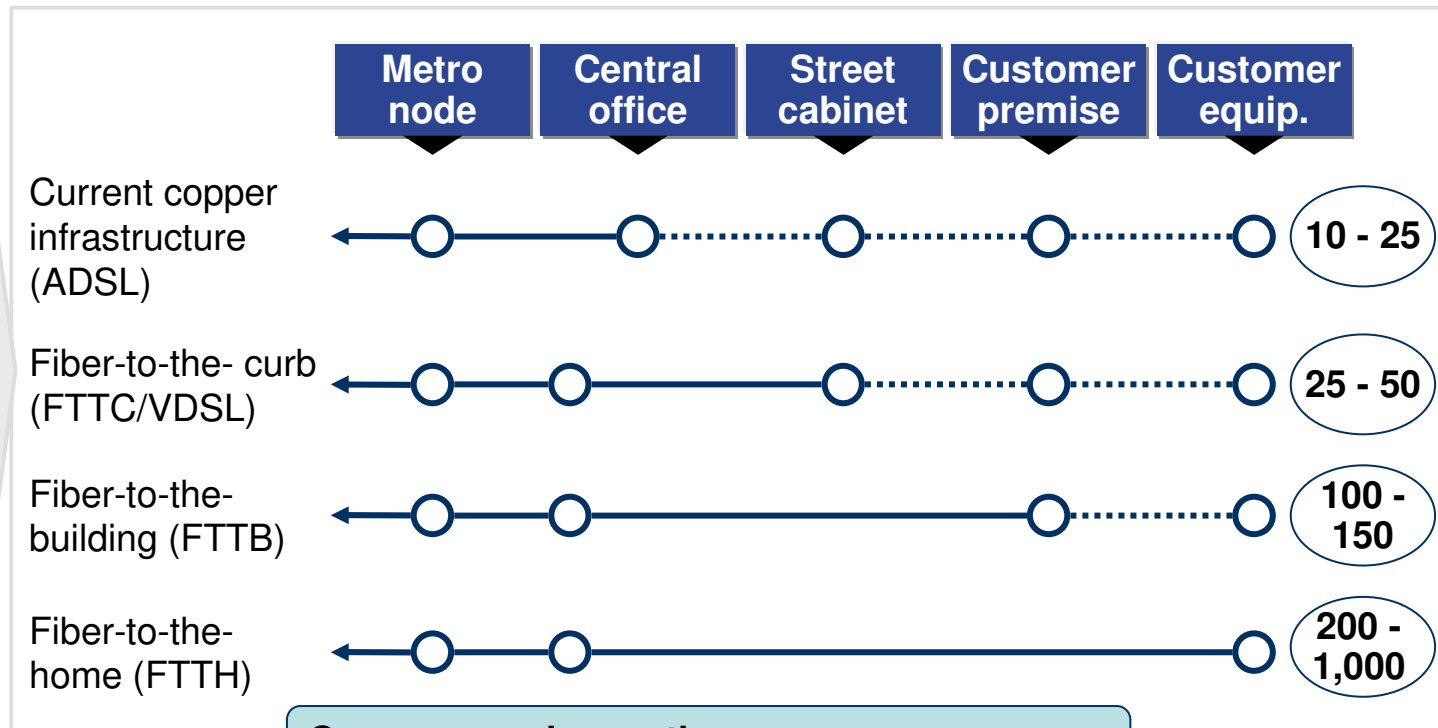
# Next Generation Access Networks (NGAN) would enable unprecedented broadband speeds, but the investment is likely to depend on regulatory decision-making

## Recent broadband demand growth

- Exponential growth in broadband speed demand driven by
  - Better quality of existing applications
  - New IP-based applications
  - Hardware substitution
- Access network currently the biggest bottleneck for higher bandwidth broadband offers

## NGAN as the successive replacement of the copper access network

..... Copper — Fiber ○ Supported bandwidth, MBit/s (estimated, 2010)



### Open research questions

- Will NGAN investments occur to a socially desirable level and under what conditions?
- What are efficient and feasible regulatory NGAN investment promotion strategies?



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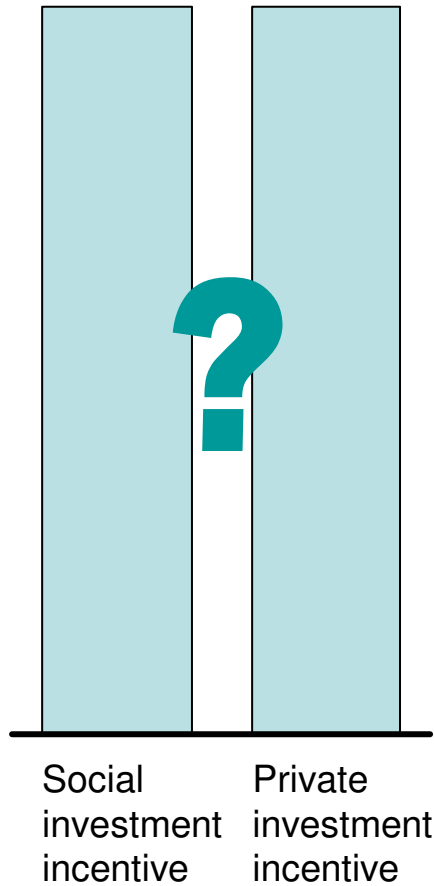
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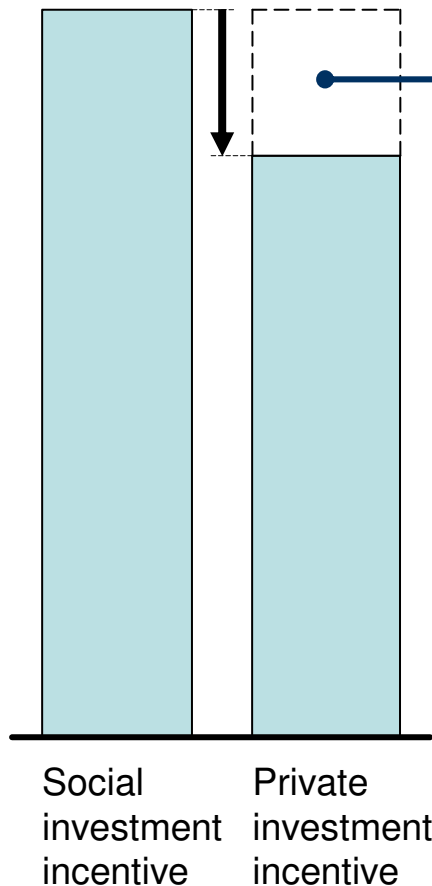
There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (1/6)

**Discounted value/proceeds  
of an NGAN investment**



# There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (2/6)

## Discounted value/proceeds of an NGAN investment

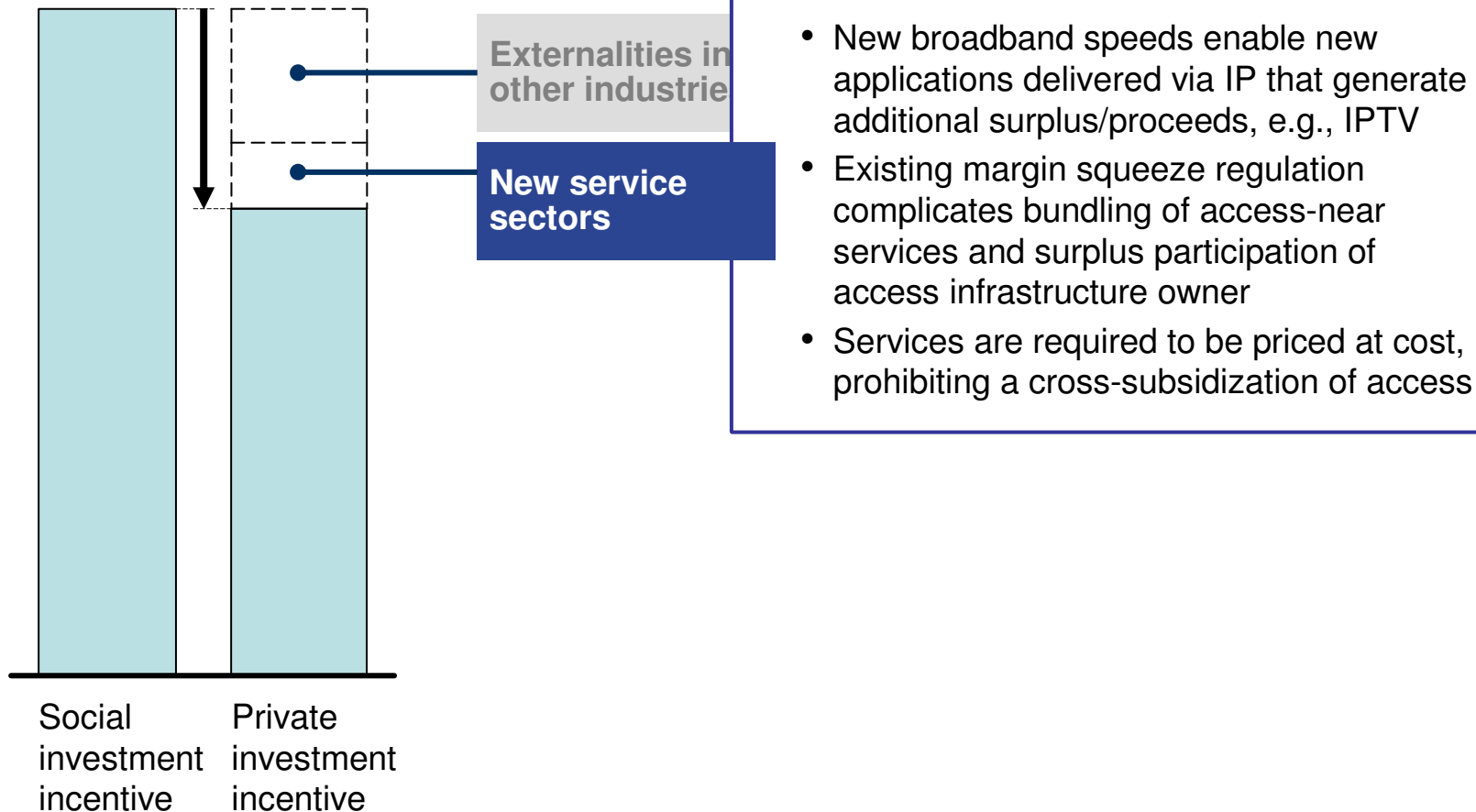


### Externalities in other industries

- Telecommunications infrastructure in the past explained a sizeable share of output growth (Röller/Waverman 2001)
- Indicative research for broadband shows equivalent results even on a regional level (Gillett et. al. 2006)
- Impact on productivity growth in other industries, human capital development, output growth, and avoided social cost
- Externalities cannot be appropriated through private investors without government intervention

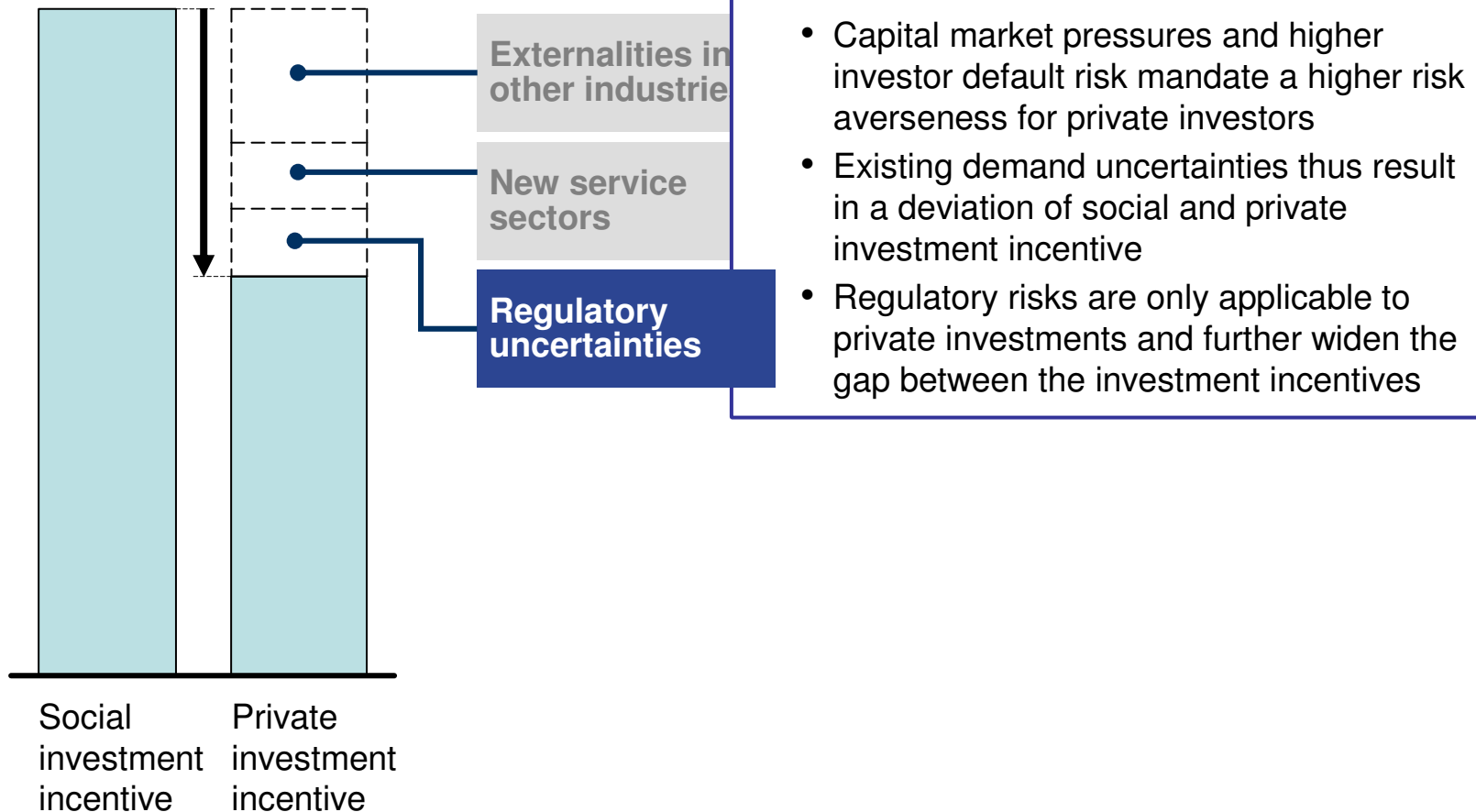
# There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (3/6)

## Discounted value/proceeds of an NGAN investment



# There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (4/6)

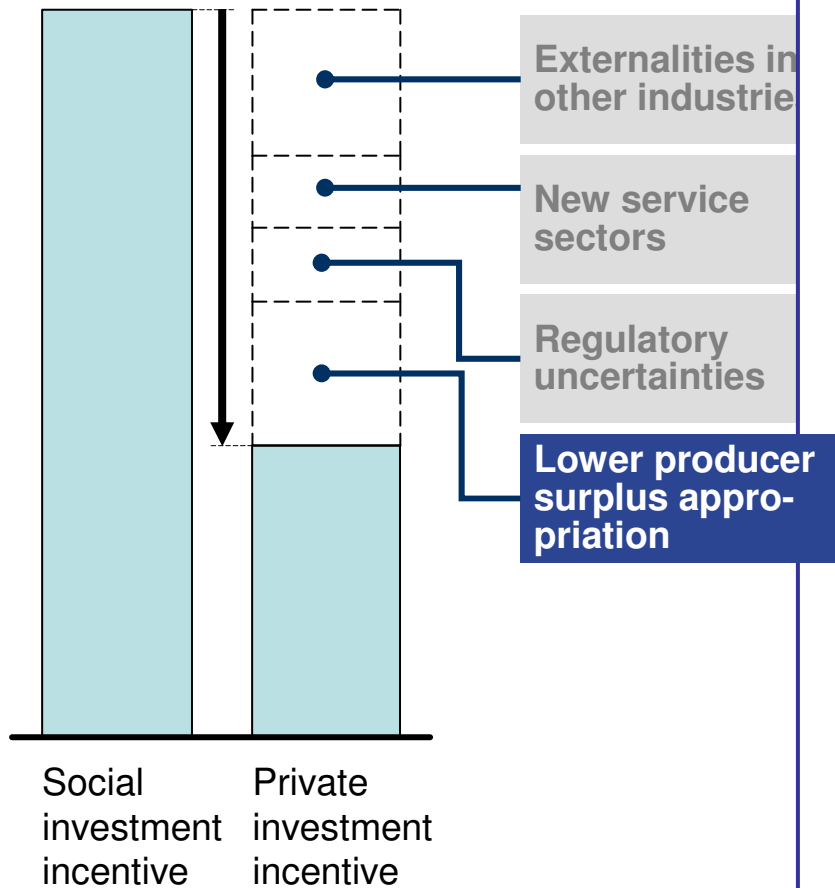
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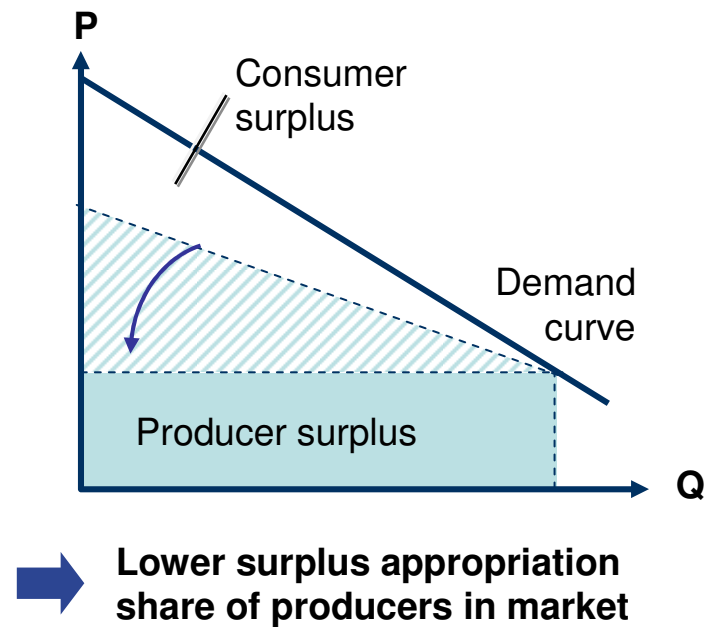


# There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (5/6)

## Discounted value/proceeds of an NGAN investment

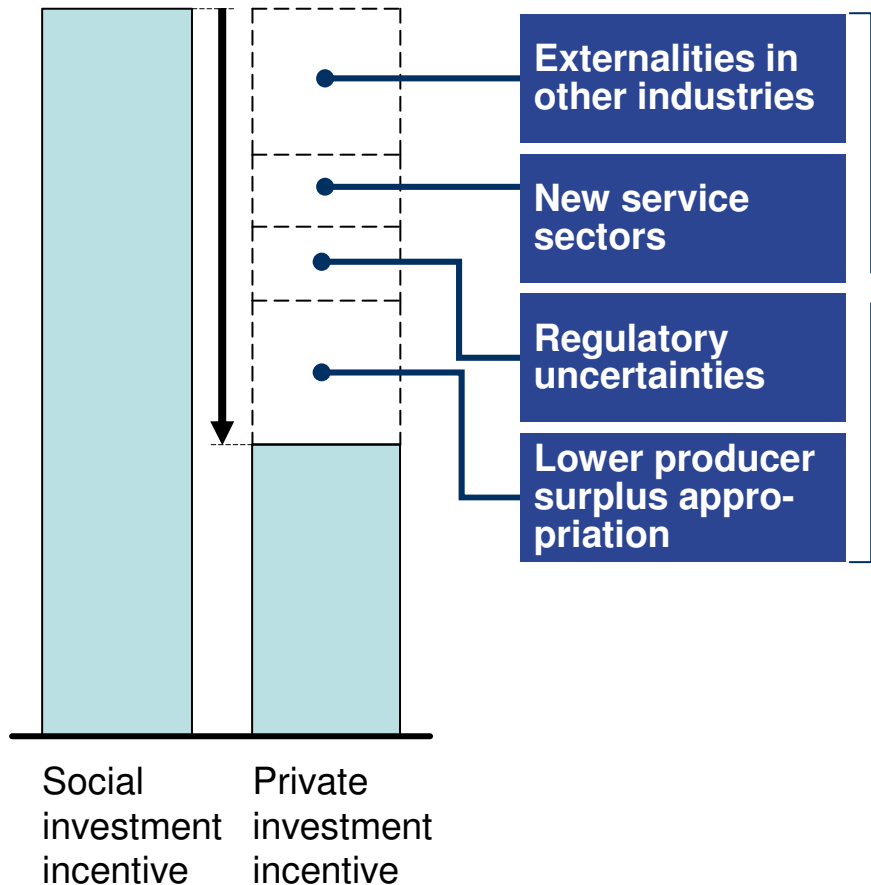


- Decreasing product and price differentiation in broadband along
  - Usage (flat-rate tariffs)
  - Speeds (passive unbundling)
  - Regions (uniform pricing)



# There is a sizeable gap between the social and the private investment incentive in NGAN leading to likely underinvestment (6/6)

## Discounted value/proceeds of an NGAN investment



## Reliance on private investment incentive will result in severe underinvestment in NGAN from a social point of view

- NGAN investment cost increase across the population footprint
- Initial investments are visible in metropolitan areas

***"The question is not whether, but how far investments will happen"***

**NGAN investment promotion required to restore socially desirable investment levels, population coverage**

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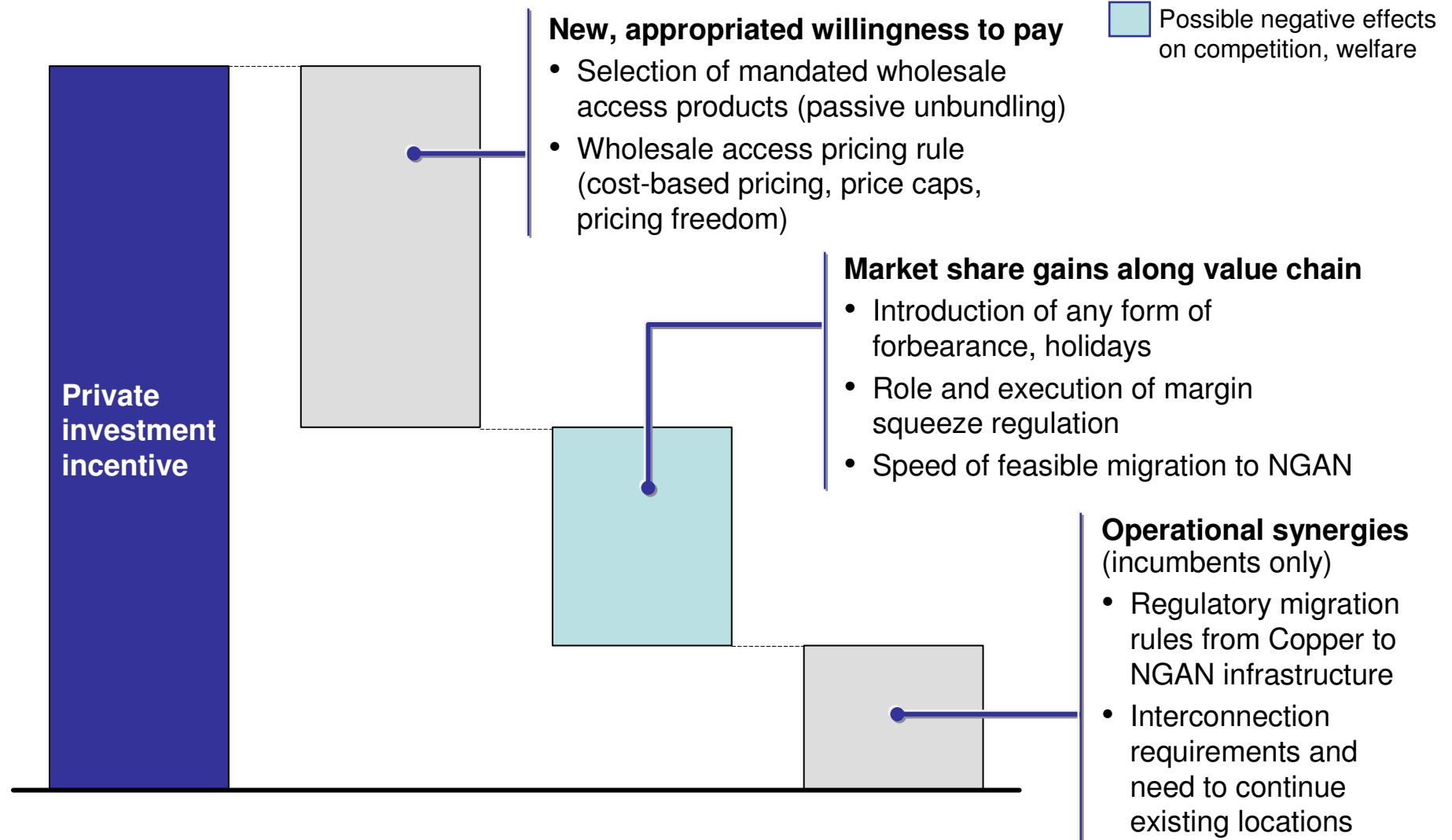
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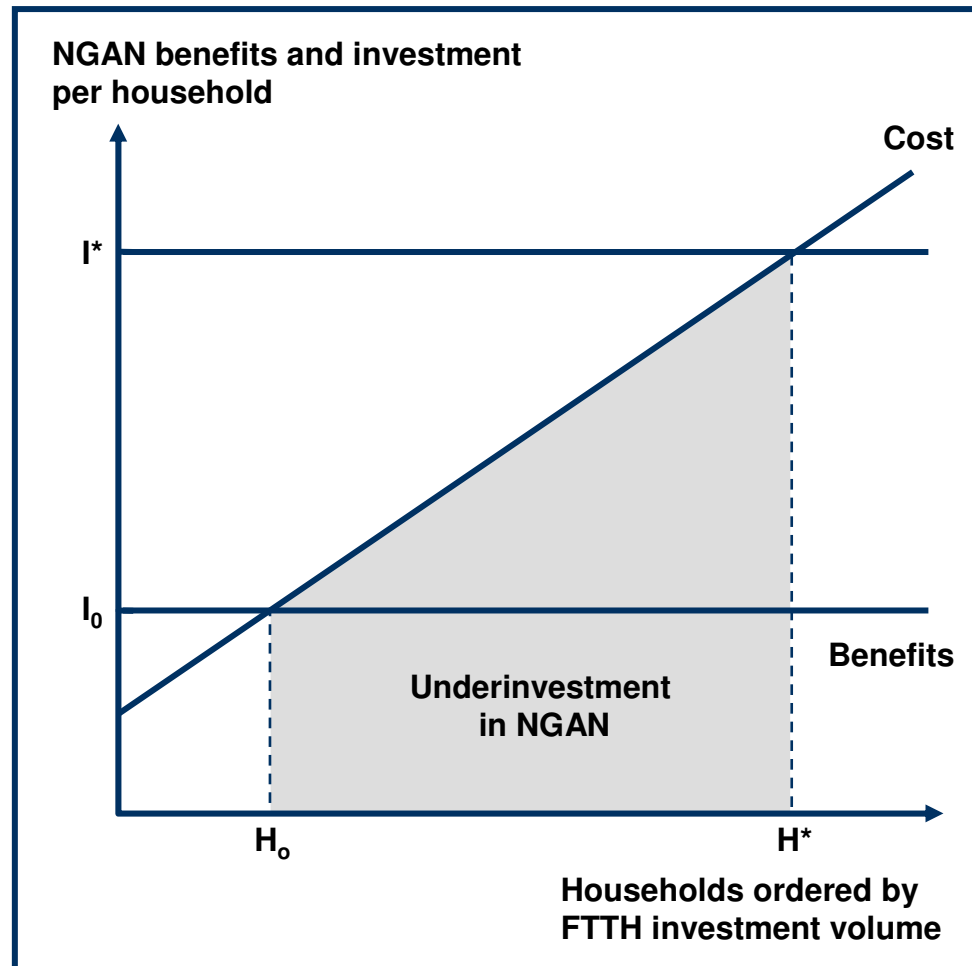
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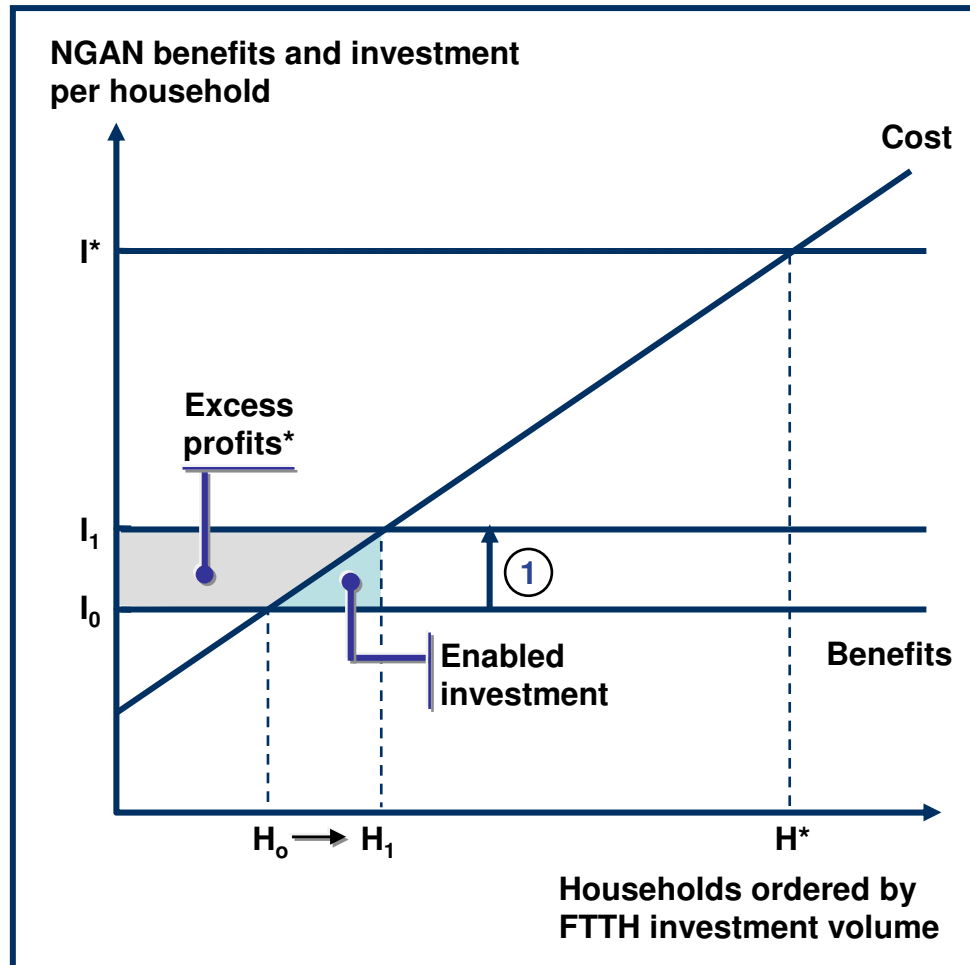
# Regulatory decision-making will significantly drive or inhibit private investments in NGAN



# Economic model of NGAN investment decisions helps to understand the effectiveness of investment promotion (1/4)



# Economic model of NGAN investment decisions helps to understand the effectiveness of investment promotion (2/4)



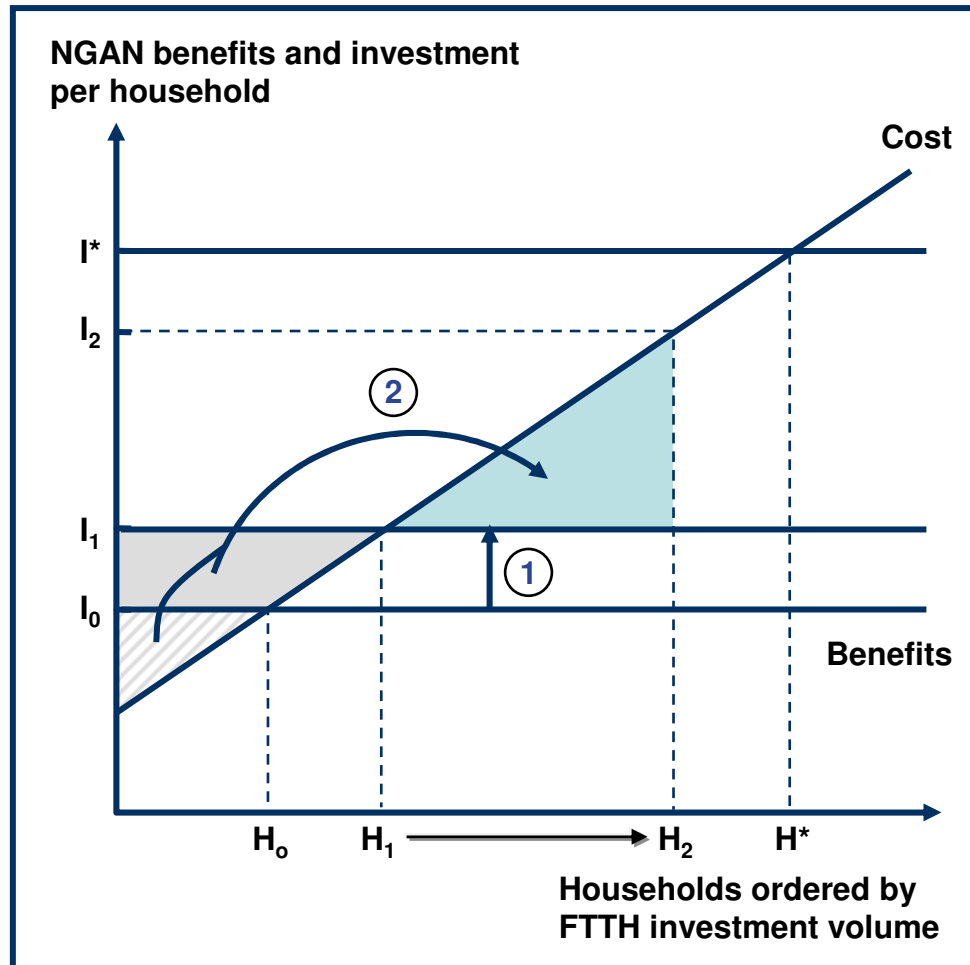
## NGAN investment promotion levers

### 1 Improvement of private incentives

- NGAN investment-friendly decision-making along all dimensions (e.g. USA)
  - Choice of access products
  - Wholesale access pricing
  - Migration to new network

\* Returns exceeding the required cost of capital of the investor after allowing for the associated investment risk

# Economic model of NGAN investment decisions helps to understand the effectiveness of investment promotion (3/4)



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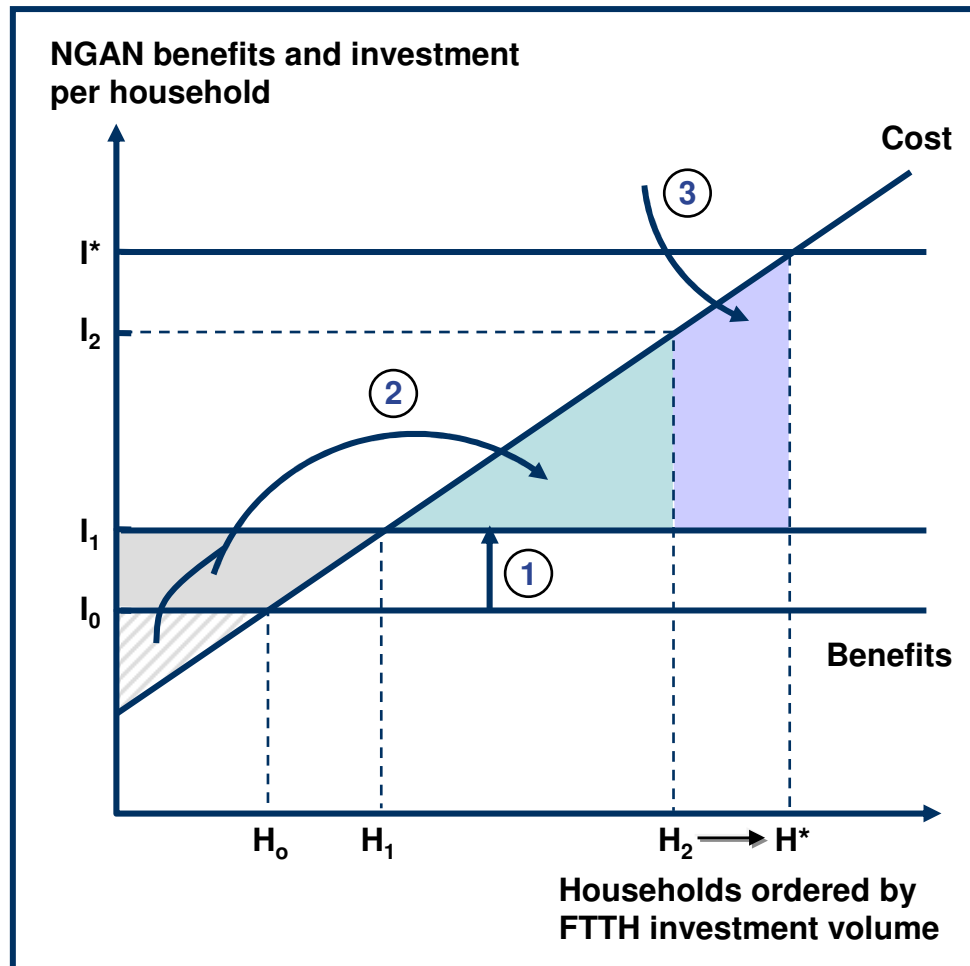
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### 2 Regional rebalancing

- Application of excess profits in favorable areas to finance investments beyond (e.g. Singapore, Australia, UK)
  - Licensing/tendering of investment
  - Rate-of-return regulation

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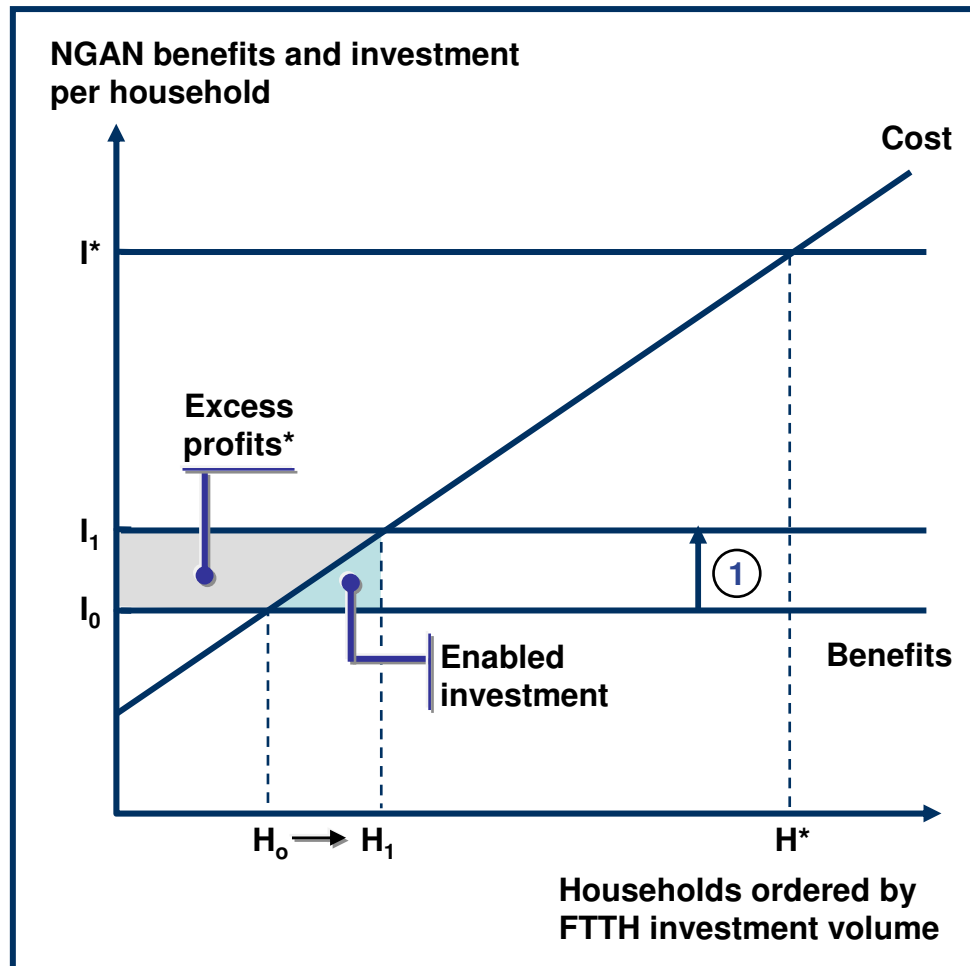
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### 3 Financial support from government

- Fiscal transfers targeted at formerly unprofitable investments (e.g., Denmark)
  - Direct support (subsidies)
  - Indirect support (tax breaks)



# Investment promotion measures, however, can have disadvantages and are highly interdependent (1/2)



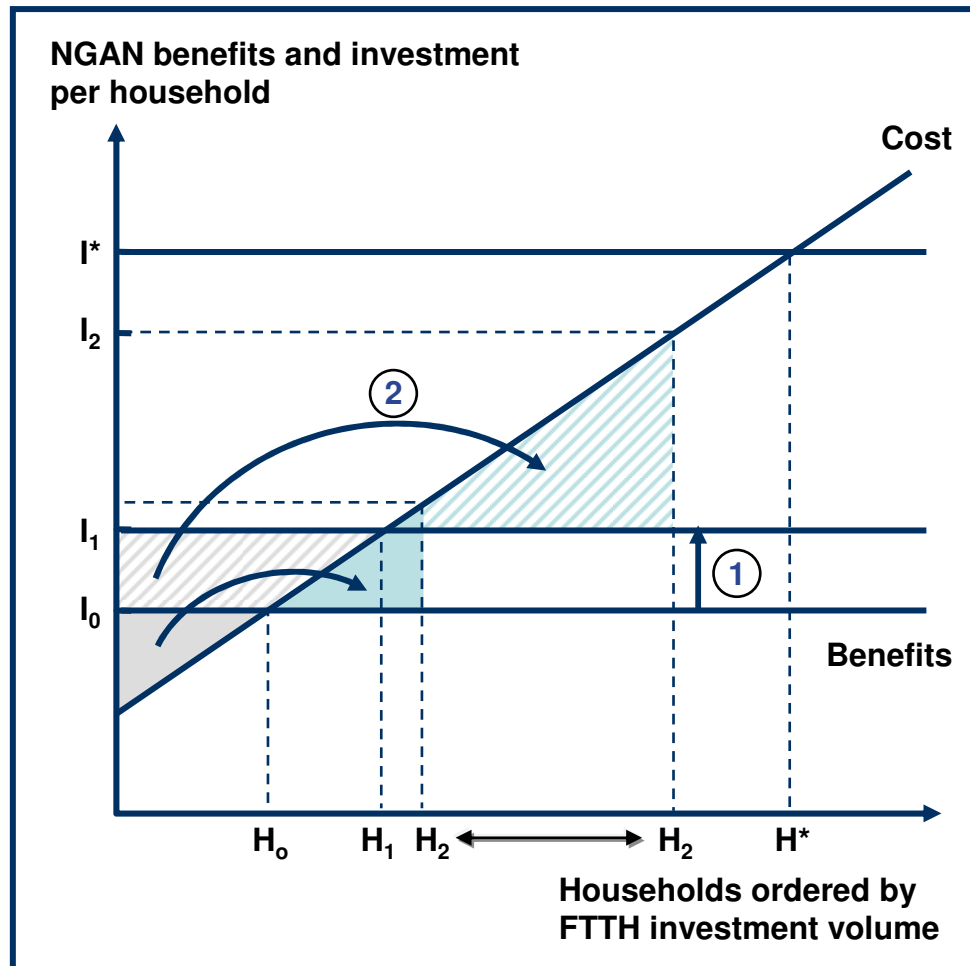
## Challenges in NGAN investment promotion

### ⚡ Drawbacks of regulatory-induced NGAN benefit improvements

- Regulatory concessions can have negative effects on competition and welfare
- On top of NGAN investments, concessions create high excess profits
  - Excess returns reduce total surplus
  - Attract infrastructure competition
  - Price interdependencies harm investor benefits across footprint

\* Returns exceeding the required cost of capital of the investor after allowing for the associated investment risk

# Investment promotion measures, however, can have disadvantages and are highly interdependent (2/2)



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### ⚡ Regional rebalancing requires excess profits to be effective

- Investment promotion effectiveness dependent on amount of excess profits
- Excess profits need to be generated and protected for investment promotion
  - Employ NGAN benefit improvements
  - Prevent infrastructure competition
  - Avoid sub-national markets approach

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- Next Generation Access Networks (NGAN) are the next technology evolution in fixed telecommunication industry and will enable broadband bandwidth growth in the next 20 – 30 years
- In NGAN, private investment incentives significantly lag behind social investment incentives, yielding a high level of NGAN underinvestment and a limited population coverage of the technology
- Regulators should engage in NGAN investment promotion to avoid underinvestment from a social point of view
- Currently discussed investment promotion measures that focus on improving the benefits of the investor are rather ineffective, generate undesirable excess profits and are likely connected to negative effect on competition
- Regional rebalancing seems to be a more effective investment promotion strategy, however, requires far-reaching regulatory policy shifts
  - Introduction of a rebalancing paradigm in NGAN regulation (licensing/tendering, rate-of-return regulation)
  - Protection of excess profits and avoidance of infrastructure competition
- In Europe, these considerations need to be embodied in the current discussion to prevent a regulatory framework that will necessarily result in structural underinvestment in NGAN

Thank you very much for your attention!



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