


Access regulation and investment in Next Generation Networks – a ranking of regulatory regimes

A decorative graphic consisting of a small black horizontal bar above a gold-colored downward-pointing arrow shape.

Facilitating the roll-out of
Next Generation Access Networks

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Introduction (I)

Telecommunication industry is in the midst of a disruptive technological development

- Next generation networks (NGN) allow data transmission speeds to increase from the current 16 Mbit/s to – at least – 100 Mbit/s
- Enable new applications and potential benefits to consumers
 - higher bandwidth allowing IPTV, HDTV
 - interactive gaming and TV
 - higher capacity than copper based access
- However, uncertainty whether consumers are actually willing to pay for new services

Debate as how to regulate access to next generation networks

- Relatively slow NGA take-up in Europe
- Incumbents cite tight or uncertain regulatory regimes as barriers to investment
- Entrants seem to consider the existing regulatory regime appropriate for NGA
- Regulators have to balance (ex-ante) investment incentives and (ex-post) access / competition

Introduction (II)

Practical approaches to NGA regulation (examples)

- Existing regulatory regime
 - practically, often based on long-run incremental cost regulation (LRIC)
- Risk premium
 - European Commission, Draft Recommendation on regulated access to Next Generation Access Networks, 2008
- Risk sharing
 - Deutsche Telekom (and others) proposition
- Regulatory holiday (fibre to the cabinet)
 - Ofcom consultation, Proposed variation to BT's Undertakings under the Enterprise Act 2002, 2009

Question

- What is the relative performance of different regulatory approaches?
- While many suggested approaches to NGA regulation may stimulate investments, do they benefit consumers?

Introduction (III)

Purpose of this presentation

- Introducing the main elements of a quantitative equilibrium model, incorporating
 - uncertainty about NGA market success
 - (ex ante) investment incentives
 - (ex post) access / competition conditions
 - different regulatory regimes in a consistent single framework
- Based on independent research undertaken by ESMT CA (EEA conference paper)
- Presenting numerical solutions to the model
 - illustrating outcomes of the model
 - no ultimate recommendation for a specific regulatory regime, further robustness checks necessary
- Suggesting directions for further investigations

Structure

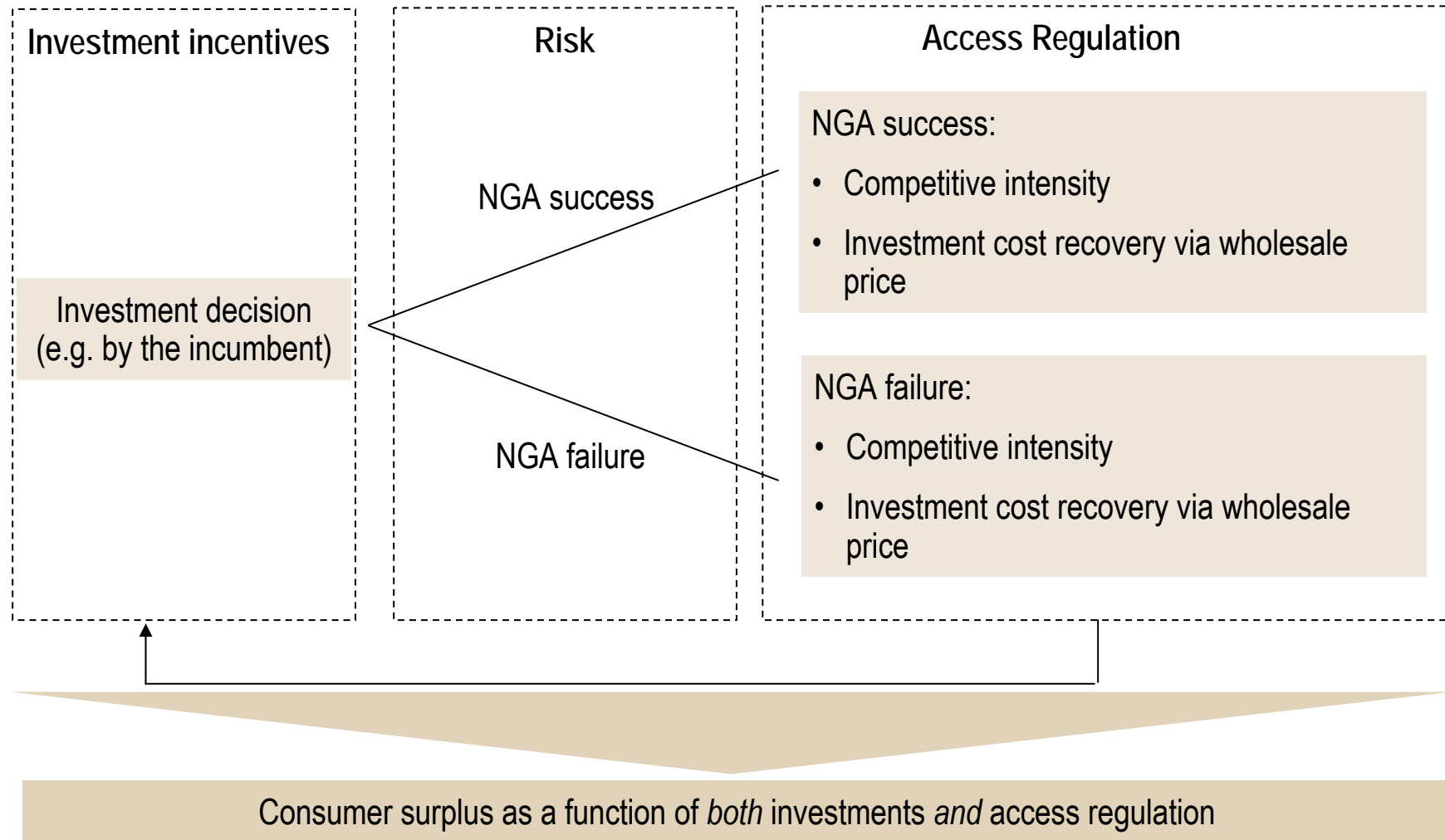
The model and regulatory regimes

Results

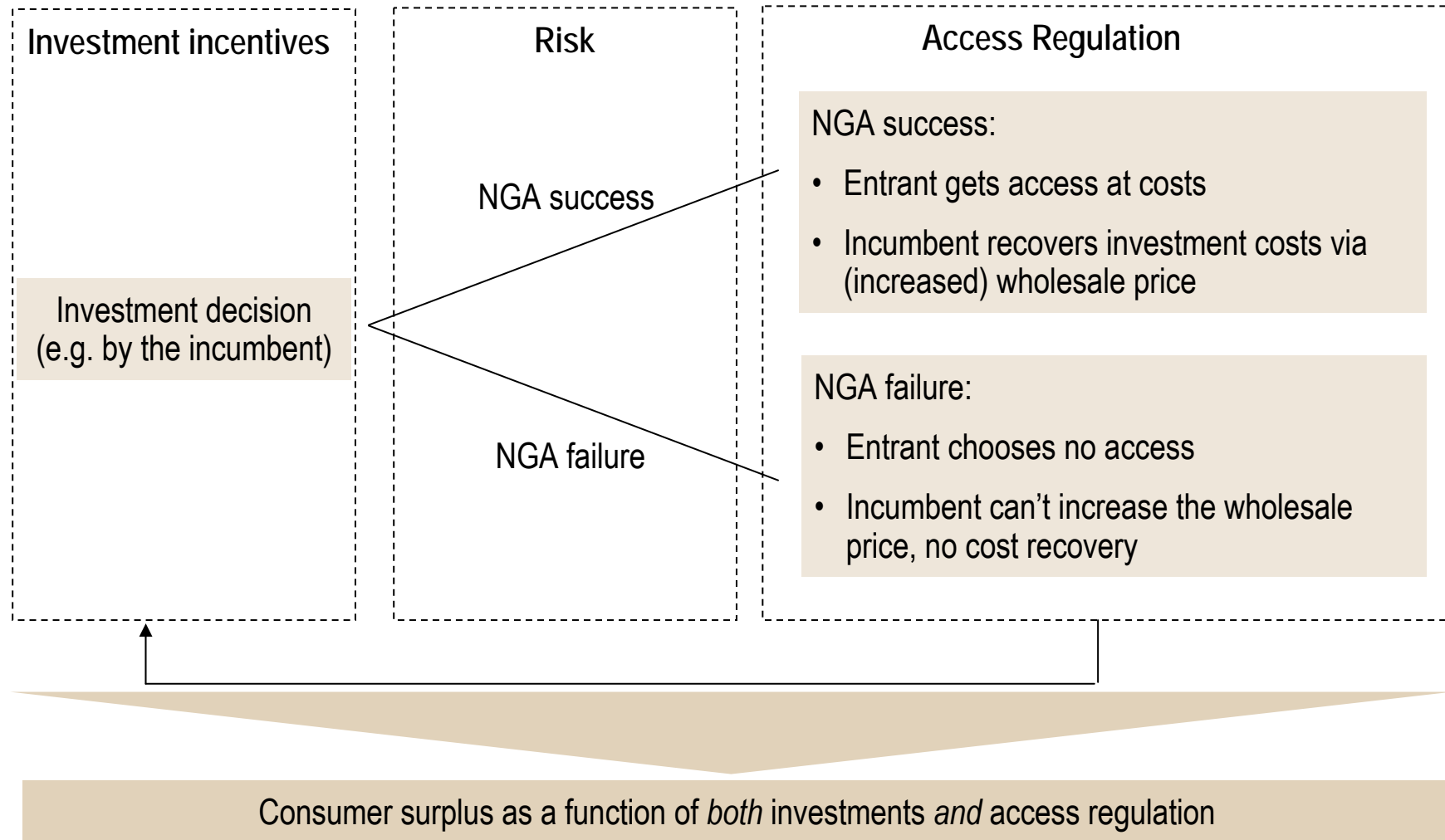
Extensions and refinements

Summary and conclusions

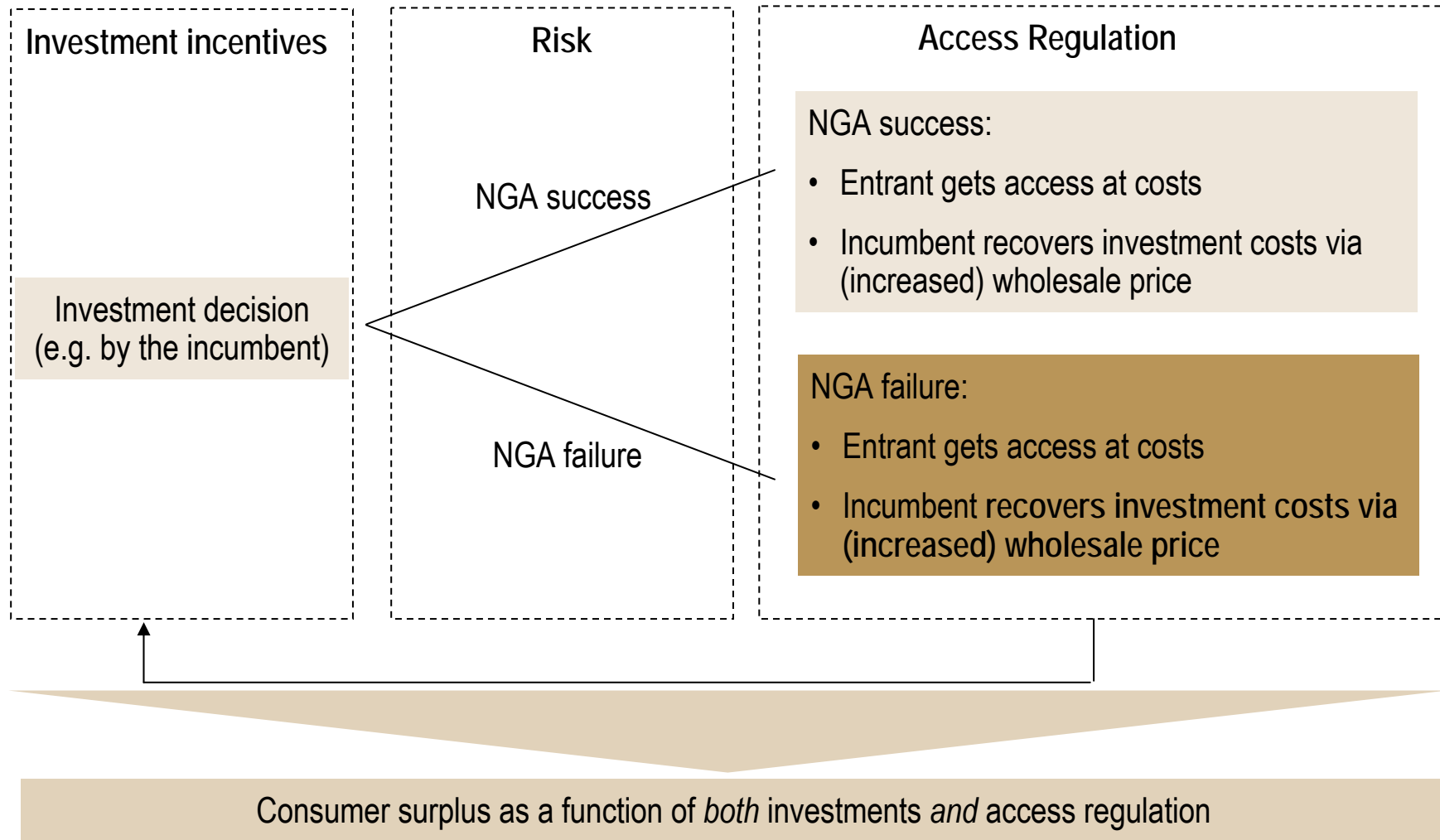
Main elements to model effects of different regulatory regimes



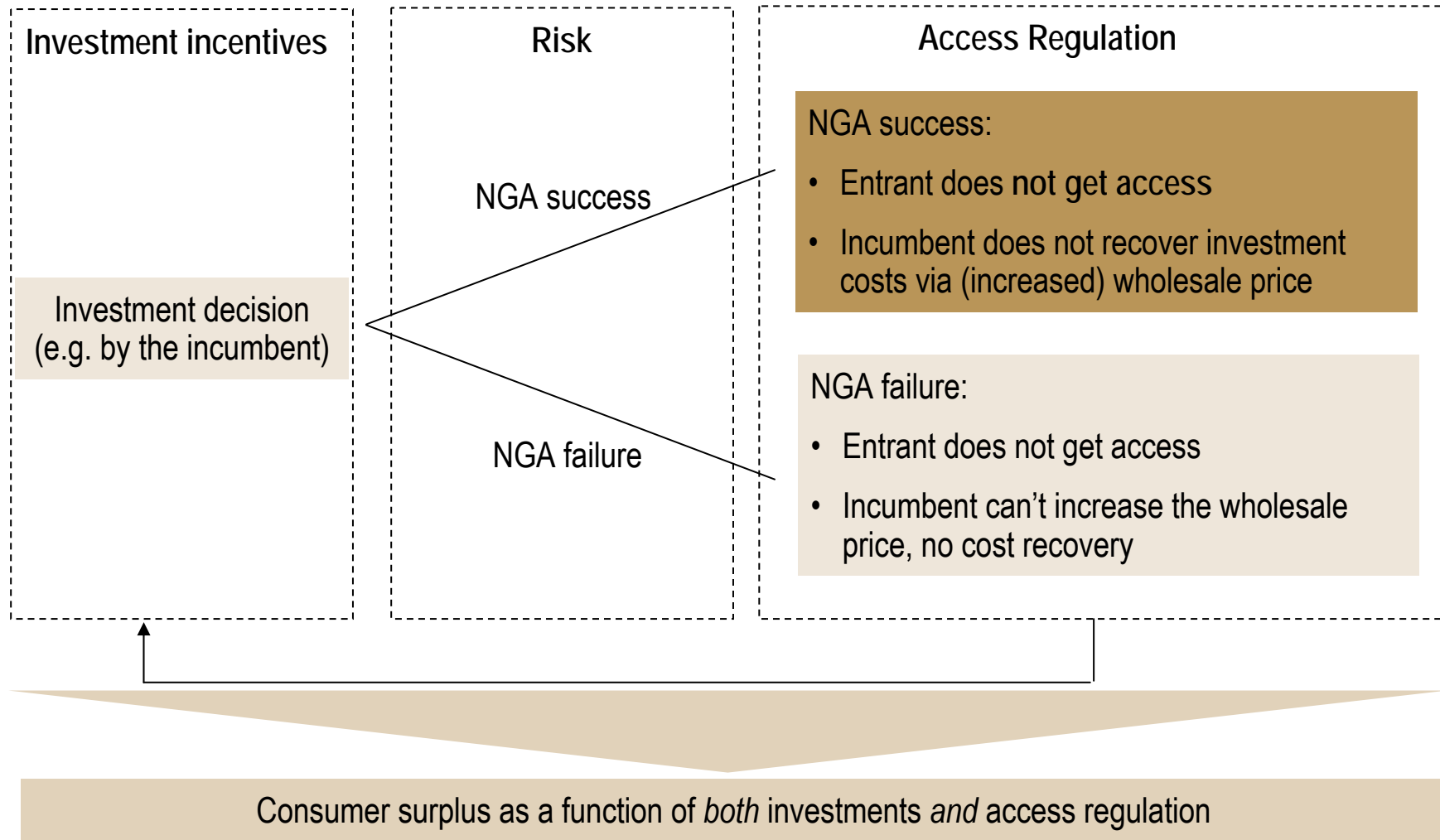
Long-Run-Incremental-Cost (LRIC) regulation as the benchmark case



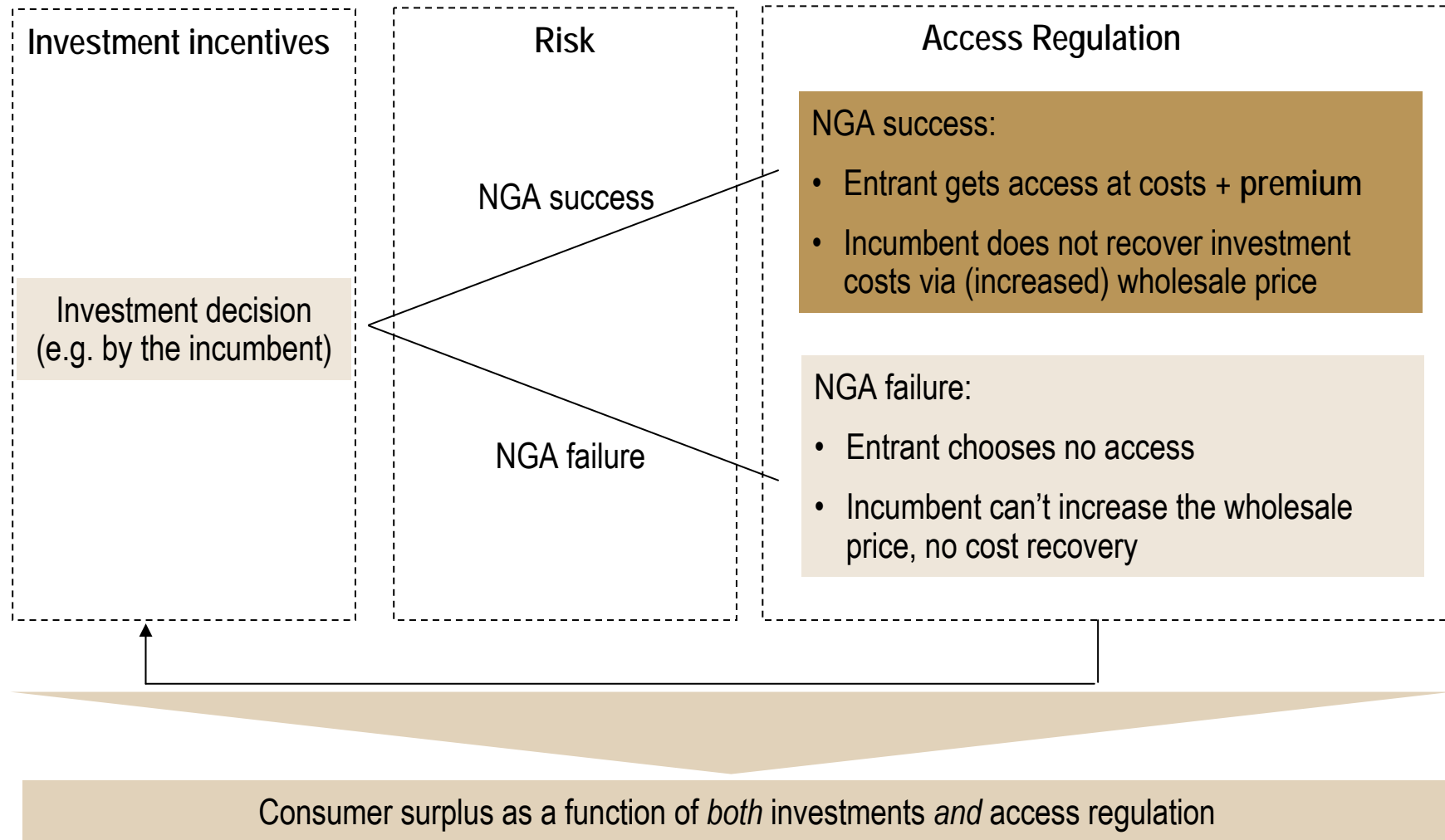
Alternative # 1: Fully Distributed Cost (FDC) regulation



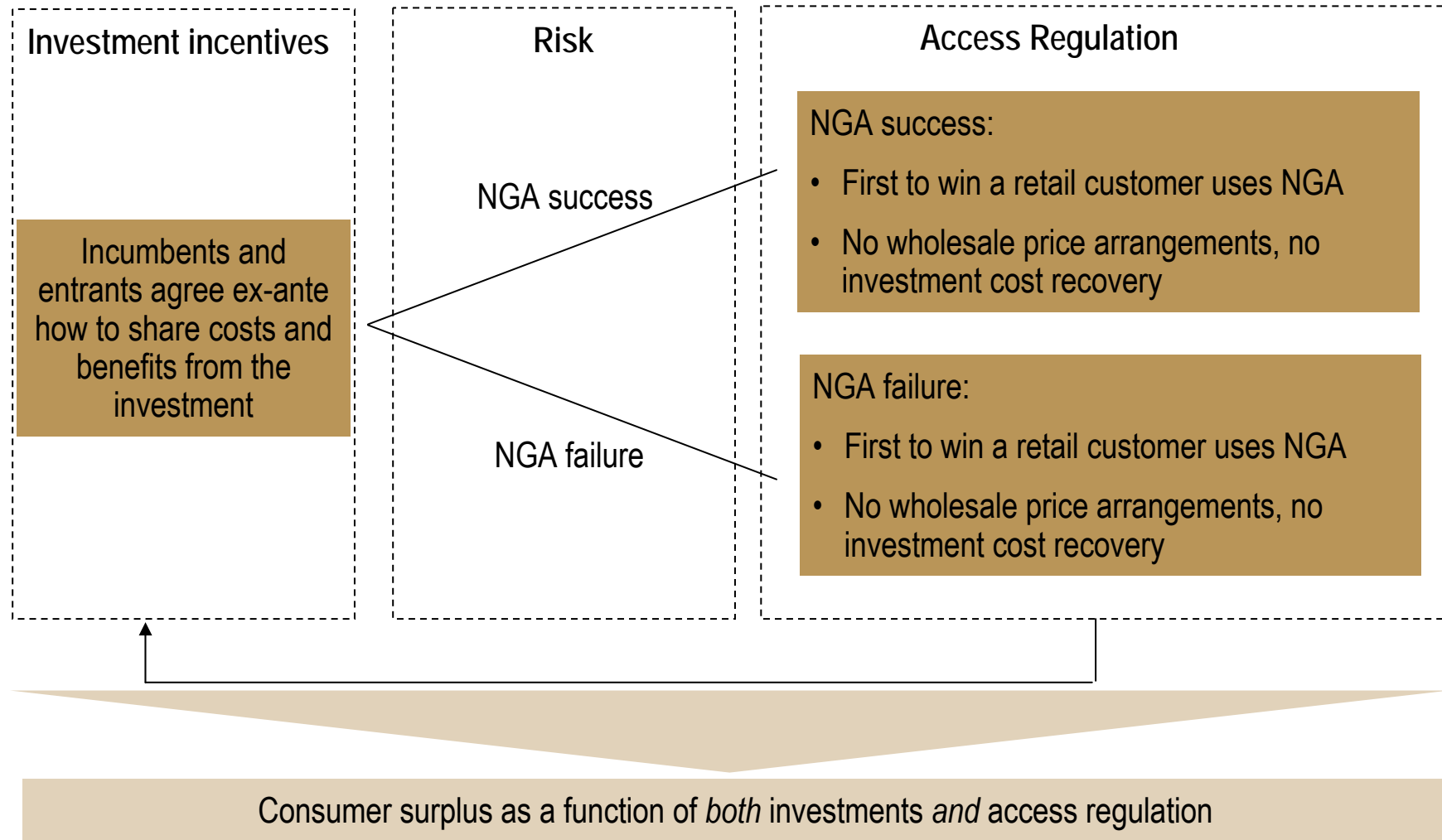
Alternative # 2: Regulatory Holiday



Alternative # 3: Risk Premium



Alternative # 4: Risk Sharing



Mathematical implementation

- Two players
 - investor (incumbent)
 - access seeker (entrant)
- Both firms have symmetric access to the legacy network
- Two-stage game theoretical framework
 - NGA investment stage
 - Cournot retail competition, given the regulatory setting, the legacy network and NGA (non-)success
- Solution via backward induction
- Formal results and numerical results via Mathematica
(robust over the plausible parameter range, caveats apply for risk-premium case)

Structure

The model and regulatory regimes

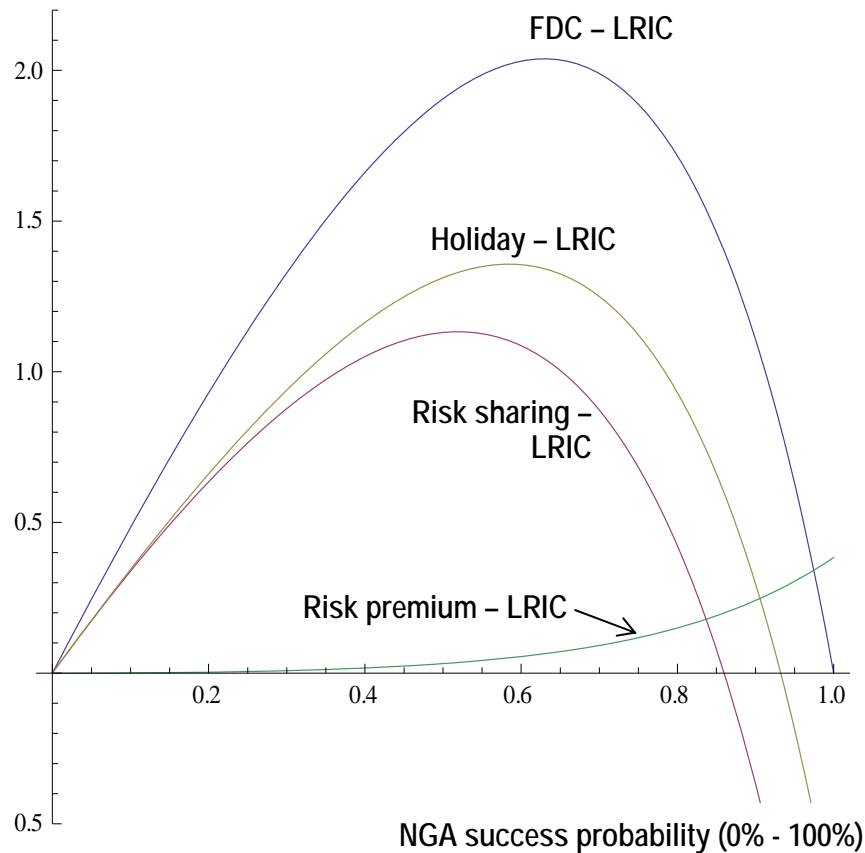
Results

Extensions and refinements

Summary and conclusions

Investments are stimulated by all regulatory alternatives

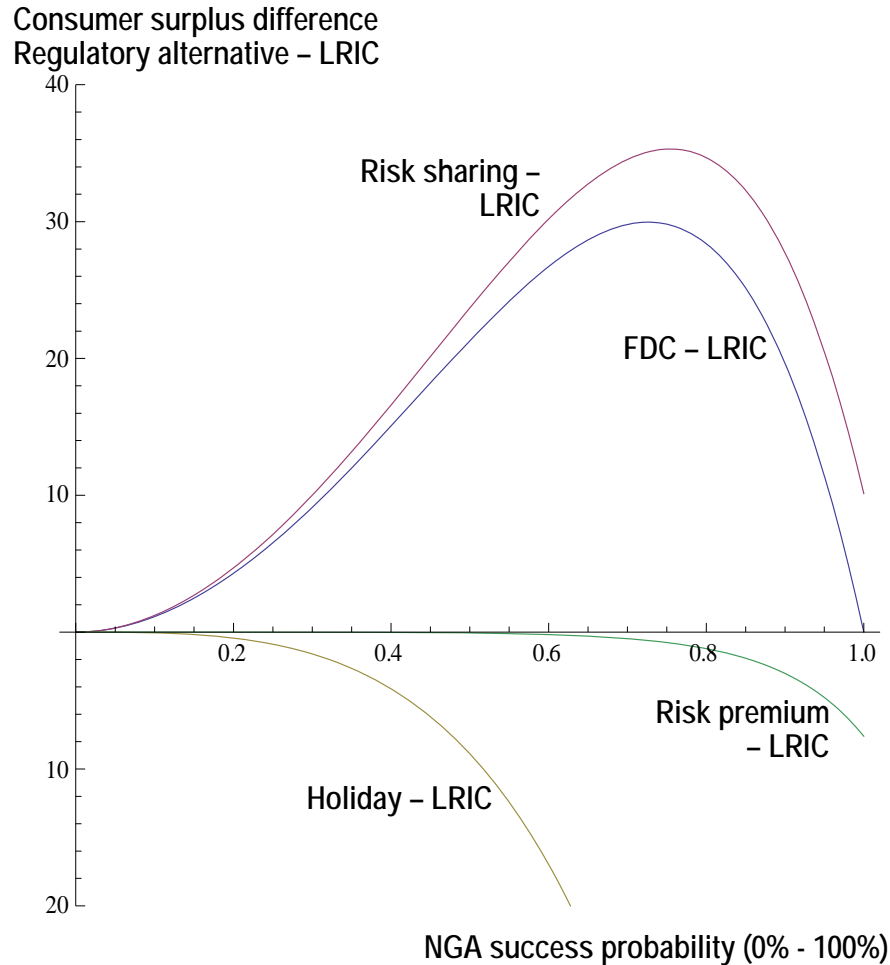
Investment difference
Regulatory alternative – LRIC



- **Fully distributed costs (FDC)** stimulate investments
 - lower risk of stranded assets
 - ex-post cost recovery via wholesale price softens competition and increases returns on investment
- **Holiday:** in the case of success, access asymmetry as disadvantage for the entrant, incumbent has incentive to invest
- **Risk sharing** stimulates investments
 - investment costs and risks are shared
 - *but* no ex-post cost recovery via wholesale price intensifies competition and decreases returns on investment somewhat
- **Risk premium** has relatively low (high) leverage if the probability of success is low (high)
[example, requires more robustness checks]

Source: ESMT model, parameters: $a = 100$, $c = 20$, $\gamma = 5$, risk premium (1+20%)

Consumer surplus is only increased by some regulatory alternatives



- **Risk sharing** creates the biggest benefit to consumers
 - increased investment (less as under FDC)
 - ex-post access to all participating Parties
 - *no* ex-post investment cost recovery via wholesale price (intensifies competition)
- **Fully distributed costs (FDC)** benefit consumers
 - increased investment
 - ex-post access to all Parties
 - *but* ex-post investment cost recovery via wholesale price (softens competition)
- **Risk premium** also seems to induce asymmetric market structure (to a lesser extent as holiday); if it has any leverage, it may not benefit consumers [example, requires more robustness checks]
- **Holiday** induces asymmetric market structure; high NGA investments do not seem to benefit consumers

Source: ESMT model, parameters: $a = 100$, $c = 20$, $\gamma = 5$, risk premium (1+20%)

Summary of key results – Ranking

Regulatory setting	Largest NGA investments	Highest consumer surplus
LRIC	5	3
Holiday	2	5
Fully distributed costs	1	2
Risk premium (1)	4	4
Risk sharing	3	1

Notes: All results are valid for success probability being sufficiently small, e.g. smaller than 85%
 (1) Result and ranking depend on the premium (here + 20%). Further sensitivity checks necessary for validation.

Structure

The model and regulatory regimes

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Summary and conclusions

► Extension and refinements (I)

Risk premium

- Robustness check with respect to other risk premium cases (optimal risk premium?)

Incorporate ex-post margin squeeze regulation

- Current set-up only regards ex-ante regulation
- However, in practice there is an ex-post non margin squeeze obligation
- A non margin squeeze obligation may limit the incumbent's scope to set low retail prices and to penetrate the market
- Hence, a non margin squeeze obligation affects the incumbent's investment decision in the first place
- Does a non margin squeeze obligation benefit consumers in the context of investments under uncertainty?

Risk sharing

- Current set-up supposes no ex-post wholesale price arrangements
- Explore effects of alternative risk-sharing arrangements
 - wholesale prices according to NGA investment costs
 - wholesale prices freely set by risk-sharing firms

› Extension and refinements (II)

More than one entrant

- Current set-up only regards one incumbent and one entrant
- Impact of numerous entrants on investment incentives and competition
- Sufficient number of entrants to sign risk-sharing agreements

Incumbent / entrant asymmetry

- Current set-up only considers asymmetry in terms of investor / non-investor role
- Check results for further asymmetries regarding e.g. market share

Structure

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Summary and conclusions

- Currently, little theoretical and empirical evidence of how different regulatory approaches perform, taking into account *both* ex-ante investment incentives and ex-post access / competition
- NGA regulation should simultaneously consider both aspects, investment incentives and access / competition conditions
 - all regulatory alternatives seem to induce more investment than LRIC
 - however, results derived from the ESMT model suggest that only risk sharing and fully distributed costs may also create higher consumer surplus
- Regulatory alternatives may involve gains for all stakeholders: incumbents, entrants and consumers (model extension required)
- ESMT model offers framework for integrated analysis, further analysis is necessary to gain comprehensive understanding
 - validate robustness
 - allow for extensions

Thank you!

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