

Allocating the cost of long-term contracts

A review of issues and potential approaches

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Objective of the paper

- ▶ Discuss the concept behind what we call the demand side of long-term contracts (LTC)
- ▶ Define some of the potential policy market design issues that can be raised when implementing LTC
- ▶ Provide literature to build a framework for the study of the demand side
- ▶ Raise new questions that could lead to further theoretical / quantitative / empirical work.

So far for the literature

Focused on the supply side effect of LTC

▶ **Dynamic Efficiency of LTC**

- ▶ How LTC affects industrial decisions associated with capacity availability (entry/exit/mothballing)
- ▶ LTC price formation as given (or very simple)
- ▶ Dynamic effect on short-term markets (allocative externalities)
- ▶ Usually, to compare different LTC.

▶ **Static Efficiency of LTC**

- ▶ How do prices emerge on LTC? What is the effect of different market design?

Are LTC only supply side mechanisms ?

In theory, LTC are useless for short-term and long-term market efficiency. But we live in a second-best world. We can think of LTC as tools to :

- ▶ **Missing Money**: bridge the gap between social value and private value of an investment
- ▶ **Missing Market** : hedging / commitment device against regulatory risk
- ▶ **Pigouvian tool**: Put a price on the investment availability which can be seen as a public good

By bringing additional remuneration to producers, LTC were considered supply-side mechanisms to correct supply-side inefficiencies. For a policymaker: implementing LTC = choosing an insurance volume of investment.

Implications for market design

However, Missing Money / Missing Market and Piguouian Approach are ultimately based on the social value of an investment = **Willingness to Pay**.

Questions that seem a priori to be administrative / implementation matters :

- ▶ **Who should be buying the capacity?**
 - ▶ How you choose the demand function on LTC.

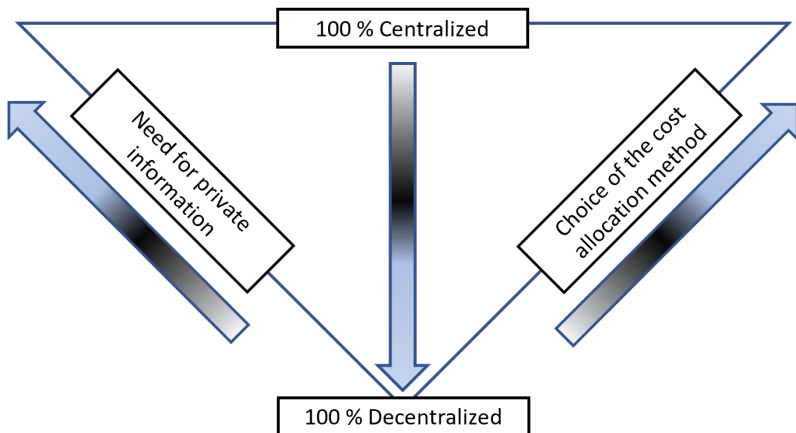
- ▶ **Who should be paying the capacity?**
 - ▶ How to allocate the cost of LTC.

- ▶ **How much available information do you need as a policymaker?**
 - ▶ (i) for determining the level of investment (ii) for an efficient cost allocation

Are in fact deep economic matters : (i) indirect economic effect they may generate for the system (ii) they help reconcile the social value with the private value of investments.

Centralization/Decentralization debate

Concepts behind the demand side of LTC and market design issues are particularly relevant when applied to the debate between centralization/decentralization.



Allocation Issue

What is the best market design to allocate the LTC procurement costs?

▶ **Centralized**

- ▶ + tailor the allocation to the agents.
- ▶ - administrative costs, policymaker \neq social value

▶ **Decentralized**

- ▶ + flexibility with respect to the states of the world.
- ▶ - no control over allocation method and potential distortion

Is there an optimal allocation mode? Is it unique, or does it depend on the states of the world ?

Information Issue

Which market design requires the most (the least) information?

- ▶ How much does each consumer want to pay for LTC? (incomplete information)
- ▶ Who should be paying for LTC? (redistributive issues)
- ▶ Who should receive information? (strategic behavior)

Centralized: More Information. Decentralization: Less Information

Note that this is the same information that you need to derive the efficient level of investment

Allocation issue

Beyond the administrative issue

All LTC implies a cost of procurement. **How do we deal with the transmission channel of the cost allocation?**

Simple policy case study: Assume a centralized LTC with a single buyer

- ▶ **Lump sum allocation** (fixed part tariff) vs **variable allocation** (variable part tariff)

Fundamental idea: different transmission channels have different effects on the system.

Initial review of indirect price effect of LTC

- ▶ “Real-Time Pricing and Electricity Market Design” (Allcott 2012)
 - ▶ Capacity market price with different shares of RTP consumers – simulation

- ▶ “Do Energy Efficiency Investments Deliver at the Right Time?” AEJ (Boomhower and Davis 2019)
 - ▶ Effect of capacity price allocation on investment decisions in energy efficiency – simulation / empirical

- ▶ “Securing investment for essential goods. How to design demand functions in reservation markets?” (Monjoie and Roques 2023)
 - ▶ Formalization of equilibrium effect of capacity prices with RTP consumers under different inefficiencies assumptions - theory

What's Next ?

We extend this framework by considering retailers.

- ▶ How do they allocate this capacity price when the allocation is based on their market share
- ▶ How retailers participate in a decentralized capacity market within this framework

Centralization: policymakers must choose precisely how to allocate the cost.

Decentralization: private agents (demand side: retailers/consumers) decide the allocation.

What's Next ?

Think about the meaning of having an ex-ante budget that should be allocated on ex-post economic signals.

- ▶ **Economic approach:** budget with an endogenous price allocation (high uncertainty but low inefficiencies)
- ▶ **Technical approach:** budget with an exogenous price allocation (low uncertainty but high inefficiencies)

Formally prove the effect on investment in industrial decisions based on the level of wholesale prices (EE but maybe others)

Information issue

A missing link between supply and demand for LTC

We mostly studied how to procure but not how much (and why)

It boils down to implementing demand-side mechanism that

- ▶ (i) reveals who and how much everyone is willing to pay for LTC
- ▶ (ii) extract revenue from consumers to pay for LTC.



Initial review of consumers for LTC

Very limited when considering the dynamics of investment decisions

We propose to reclaim the literature on the second-best mechanism for demand side but with the idea of LTC

- ▶ Chao and Wilson (1987) *Priority Service: Pricing, Investment and Market Organization*
- ▶ Spulber (1992) *Optimal Nonlinear Pricing and Contingent Contracts*
- ▶ Spulber (1992) *Capacity-Contingent Nonlinear Pricing by Regulated Firms*
- ▶ Spulber (1993) *Monopoly Pricing of Capacity Usage Under Asymmetric Information*

“Designing Markets for Reliability with Incomplete Information” (Monjoie JMP)