

Price Regulation and Incentives

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Aim of price regulation

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- Regulate situations where public service provider has market power (e.g. monopoly) and could abuse its dominant position
- Control prices charged
- Provide incentives for cost reduction and quality improvements
- Control earnings

Banded Rate of Return Regulation (RORR)

- Target rate of return
- Band around target such that:
 - If earning above band, firm cannot keep extra earning. Extra earning, used to lower consumers' prices or are given to customers
 - If earning below band, then firms' prices are raised to ensure that projected earnings fall within the band
 - Example (fig 1):
 - target: 12%
 - Firm cannot retain anything above 13%
 - Firm protected against low return below 11%
 - Good for risk sharing on profits
 - May weaken incentives to raise demand and lower costs
 - Cap is inefficient

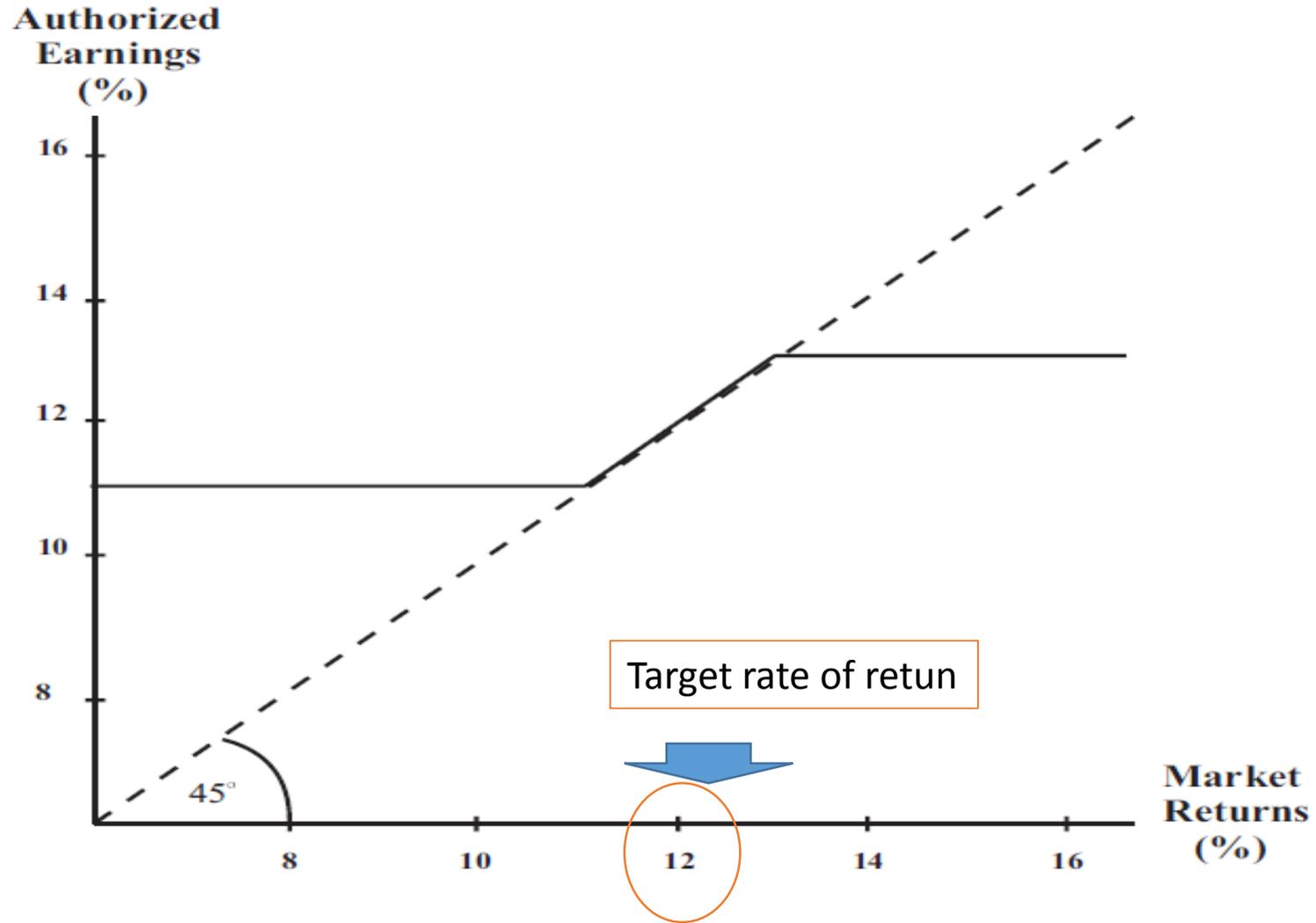


Figure 1. Banded Rate of Return Regulation.

Earning share Regulation (ESR)

- Target rate of return
- Band around target such that:
 - If earning above band, then earning are shared: consumers's prices are reduced or a share of earnings are given to them, up to a cap
 - If earning below band, then prices are raised to keep up projected earnings

Example (fig 2):

- target: 12%
- Firm can retain all earnings within band 10-14%
- Firm retain half of extra earnings above 14%; the other half is given to customers
- Firm partially protected against low earnings, as 50% top up when earnings btw 8-10%
- Firm fully protected against low earnings, as 50% top up when earnings below 8%

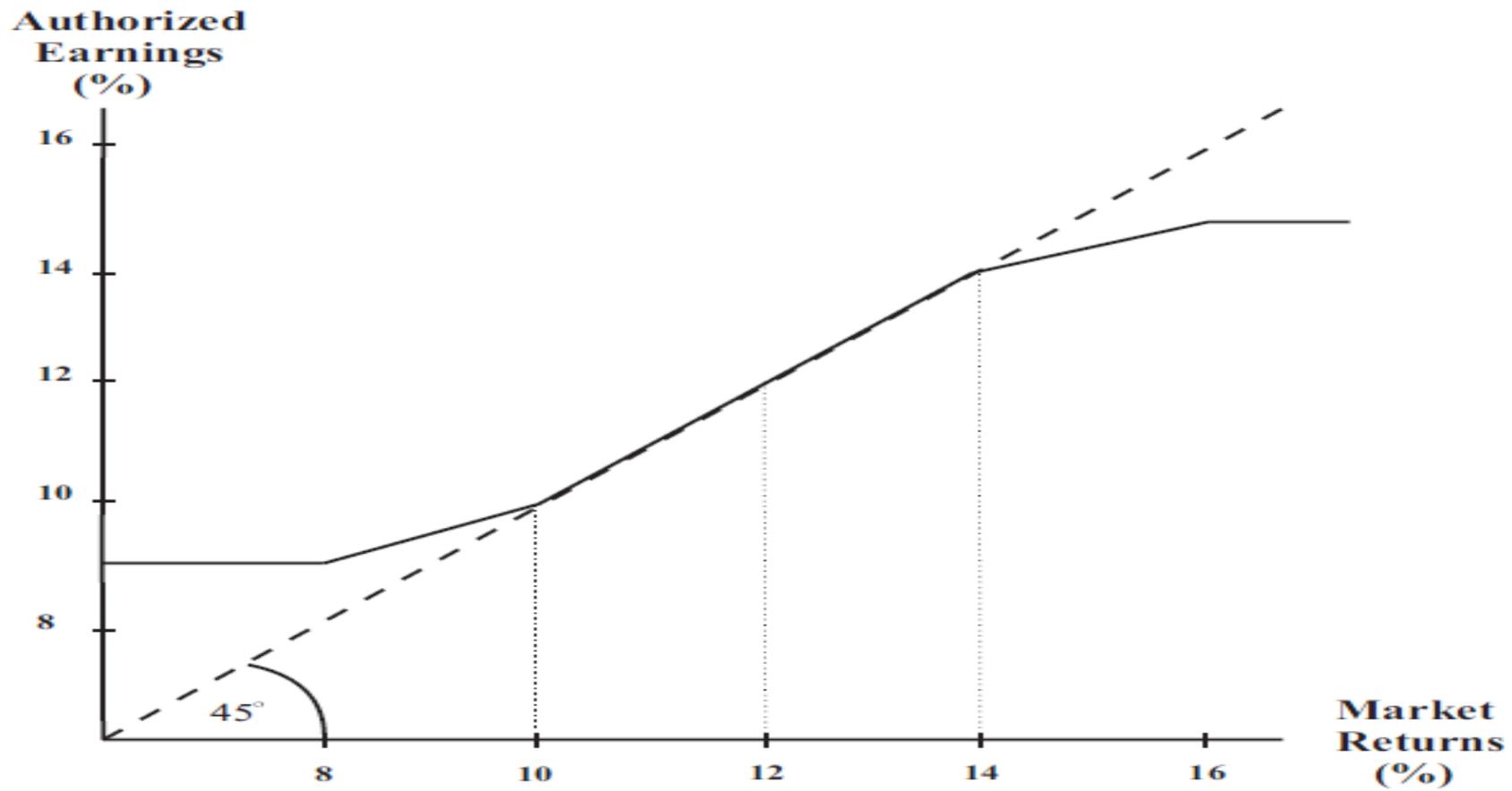


Figure 2. Earnings Sharing Regulation.

Drawbacks of RORR

Matching of allowed revenues to realized costs, it implies:

- Limited incentives for innovation and cost reduction;
- Over-capitalization
- High costs of regulation;
- Excessive risk imposed on consumers;
- If rate hearings are requested by the firm, disincentive to request hearing when revenues are high

- Cost shifting from unregulated to regulated activities
- Reduction in output of unregulated service, if common costs allocated on the basis of relative sales of regulated/unregulated activities
- Inappropriate levels of diversification and innovation;
- Inefficient choice of operating technology especially if different technologies exhibit different common costs;
- Incentives to over-invest in R&D if R&D common costs.
- Insufficient pricing flexibility due to lengthy public hearings weakens ability of firm to respond to competitive pressure

Revenue Sharing Regulation (ESR)

- As Earning sharing, but the sharing affects revenues not profits. Thus firms bear fully all its costs
- Does not weaken incentives to reduce costs
- Good when efficient to transfer operational risk to firm

Price cap regulation (PCR)

- Regulates prices not earnings
- Specifies authorized changes in regulated prices over time
- Typical

- $\Delta p \leq I - X$
- I: inflation
- X factor: productivity improvement sector wide

- Predominant form of regulation in the EU and the US since 1996.

- **Idea behind PCP:**

Cap initially set to ensure only normal profit, then inflation and productivity adjustment set industry wide are used to make sure prices reflect industry costs.

- **Variants:**

- Z factor to account for events
 - Outside firm's control (weather conditions, force major);
 - That affect the firm disproportionately (otherwise, X factor will capture them),
 - Pronounced financial impact (to make hearing worthy it)
- B factor to account for quality improvements
 - (e.g. reduction accidents on motorway – Italy
 - – number of customers complaints in telecom –
 - Waiting time to restore interrupted service in telecom)

Setting the X factor

- Reflect productivity forecasted improvements
 - If data not available, use historic data industry wide or similar countries
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- **Setting the length of time btw price review**
 - Shorter if high technological progress
 - Longer if high potential for cost reducing investment
 - Shorter if demand highly elastic, as high allocative inefficiency if prices diverge too much from costs

- **Incentives**

- Does not suffer from most limitations of RORR
- Strong incentives for cost reduction if X factor is not backward looking
- Consumers do not bear cost and revenue risk
- Incentives to raise demand strengthened if quality factor added

- **Issues**

- Price reviews often backward looking and informed by past costs, then drawbacks of RORR arise also here
- Also, inter-temporal cost shifting to soften backward looking price review

- Drawback: firm may make extra profit without price falling
- Prices may diverge substantially from costs
- Higher cost of capital because investment is more risky

- The **importance of using a weighted average**

Suppose that the regulator wishes initially to set tariffs so as to achieve a given level of CS and then to maintain over time. The desired effect on Consumer surplus $S(q(p))$ when prices change is thus:

$$\sum_i \frac{\partial S}{\partial p_i} \Delta p_i = - \sum_i q_i \Delta p_i \geq 0$$

When setting the prices $p_1 \dots p_n$, the regulator thus needs to calculate appropriate weights. As information on quantities difficult to obtain, replacing it with actual quantities may help to set the price caps:

$$\sum_i q_i^{t-1} p_i^t \leq \sum_i q_i^{t-1} p_i^{t-1}$$

- the firm is permitted to charge prices that, when evaluated at past output levels do not increase the firm's revenue above its present level
- (tariff basket regulation: Laspeyre's revenue index cannot increase)
- It implies that CS will non(decrease) over time
- Revenues cannot increase due to a discretionary change in tariffs
- firm's revenues due to increase in output are allowed.

- Variants to extract extra profit

$$\sum_i q_i^t p_i^t \leq \sum_i q_i^{t-1} p_i^{t-1} - \pi_i^{t-1}$$

- Drawbacks:
 - weakens incentives to reduce costs
 - Creates incentives for wasteful activities

- Variants to regulate average revenue

$$\sum_i q_i^t p_i^t \leq \sum_i q_i^{t-1} p_i^{t-1} - \pi_i^{t-1}$$

- Drawbacks:
 - weakens incentives to reduce costs
 - Creates incentives for wasteful activities

- Variants: regulating average revenue using forecasted demand

$$\frac{\sum_i q_i^t p_i^t}{\sum_i q_i^t} \leq p_0$$

- Drawbacks:
 - Average revenue applies to all products regardless of their cost of production. Firms may then strategically reduce those productions which are costly to produce, even if these are the most valuable to consumers
 - If firm practices price discrimination, average revenue declines when high prices are weighted less heavily and low prices are weighted more heavily. Contrary to the case with lagged weights, not price discrimination may be undertaken also when it reduces consumer surplus.

Yardstick Regulation

- Rewards to a firm based on its relative performance compared to other firms.
- As X in Price cap formula when captures industry wide productivity

Options

- Firms may be allowed to choose between alternative regulations, e.g. ROR and PC.
- Motorway: CIPE 2007: concessionaires given option to choose «concessioni a riequilibrio» e «ricognitive»
- Options can allow firms' private information to be transmitted to regulators and tailor firm's capabilities to regulations limiting likelihood of financial distress: a firm with low expectations to reduce costs may choose ROR rather than PC