How much efficiency gains and price reductions to put as ingredients into an efficiency defense? 'Quanto Basta'

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Motivation

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- Society needs to screen between good and bad mergers:
  - Consumers' Surplus (CS) versus Social Welfare (W) standard
  - Efficiency Defense accepted when based on: "*merger specific, substantial efficiency gains passed on to consumers via price reductions to offset market power effects*".

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  - ... by assuming managerial efforts determine the probability of succeeding in a process innovation leading to a reduction of the unit production costs.
- We allow for potential synergies to be exploited within a merger:
  - ... by considering several degrees of substitutability between managerial efforts.
- When efforts are unobservable, we adopt a principal-agent framework for our study.

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- Is the likelihood to commit either type I or II errors by competition authorities exacerbated by the presence of moral hazard?
- In other words, are proxies to measure efficiency gains better, or worse, calibrated than when moral hazard is absent?

Related Literature

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  - ... i.e. we allow for separation between formal and real control.
- We maintain the measure of the probability of success as in Fabrizi and Lippert, 2005.

Common Setup to Pre and Post Merger

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- Two cases: agents' efforts are either observable or unobservable.

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- Agent i's utility is function of transfer t_i and effort e_i, with $t_i \geq 0$ - i.e. agents are protected by limited liability (LL) - and $e_i \in \mathbb{R}_+$:

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- Transfers in the unobservable efforts case are:

$$t_i = \begin{cases} b_i & \text{if } (\beta c, \cdot) \\ 0 & \text{otherwise.} \end{cases}$$

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- Measure for expected efficiency in the economy, $E(S)$, given projects are i.i.d.:

$$E(S) = p_1(S) + p_2(S) - p_1(S)p_2(S).$$

Pre-Merger Characteristics, continued

- Profit of firm 1, $\pi_1(\cdot,\cdot)$, gross of the transfer to be paid to the agent, is:

$$\pi_1(\cdot,\cdot) = \begin{cases} \pi_1(\beta c, c) = \begin{cases} \frac{(1-\beta c)^2}{4} & \text{if } \beta \leq \frac{2c-1}{c} \\ c(1-c)(1-\beta) & \text{otherwise,} \end{cases} \\ \pi_1(\beta c, \beta c) = 0, \\ \pi_1(c, c) = 0, \\ \pi_1(c, \beta c) = 0. \end{cases}$$

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- The success probability of the project undertaken, $p(M)$, is:

$$p(M) := \min\left\{ \left(e_1^{1-\varepsilon} + e_2^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}}, 1 \right\} \qquad \text{with} \qquad \varepsilon \in [\underline{\varepsilon}, \overline{\varepsilon}].$$

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- Net profits are shared equally among merging parties.

No Moral Hazard

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  - Stand-alone, for firm 1 w.l.o.g.,

$$\max_{t_1} \Pi_1(S) \equiv \max_{t_1} \left[p_1(S)\left(1 - p_2(S)\right) \pi_1(\beta c, c) - t_1 \right]$$

$$s.t. \qquad t_1 - \frac{1}{2} e_1^2 \geq 0 \qquad (IR).$$

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$$\max_b \Pi(M) = \max_b \left[p(M)\pi(\beta c) + (1 - p(M))\,\pi(c) - 2p(M)b \right]$$

$$s.t. \qquad p(M)b - \frac{1}{2}e_i^2 \geq 0 \qquad (IR)\ \forall i$$

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Merger decision

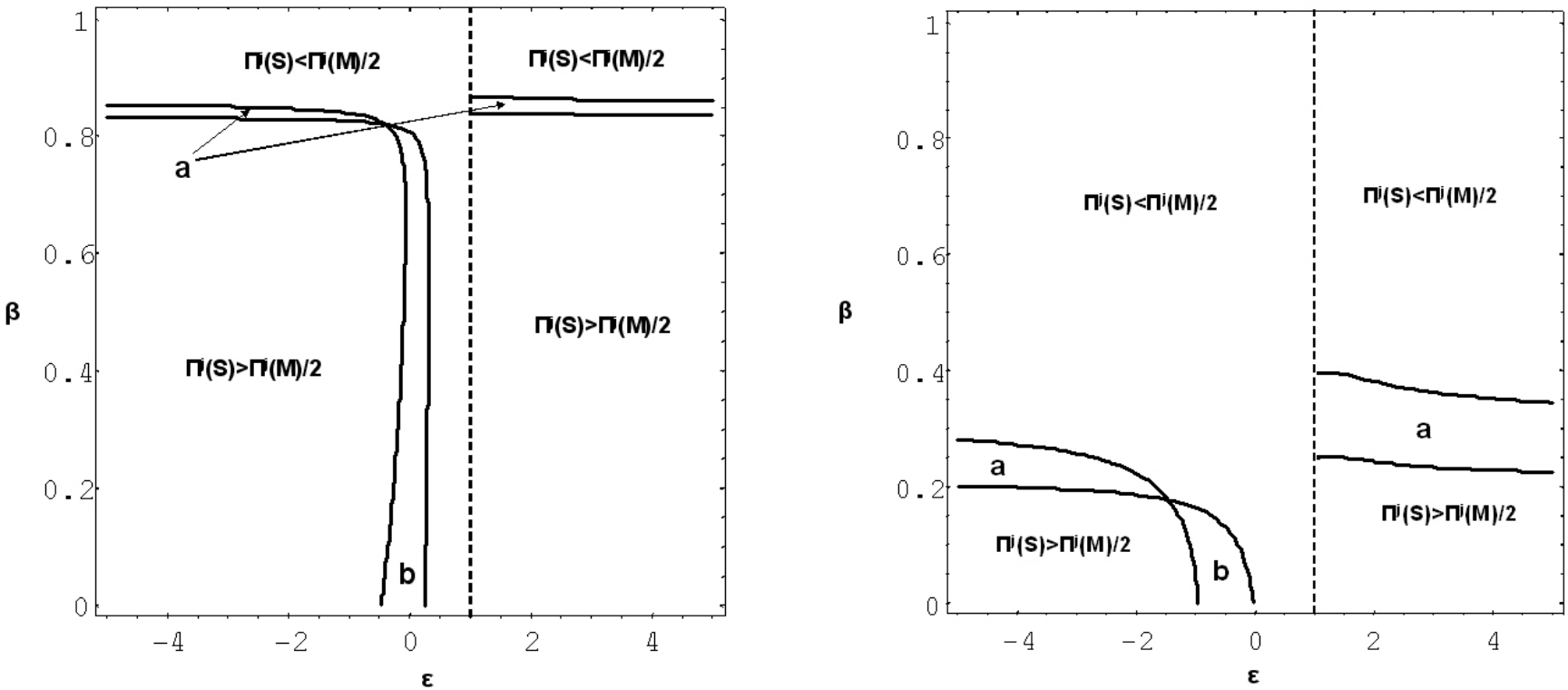


Fig. 1: Comparisons for $c = 0.99$ and $c = 0.79$

Induced Consumers' Surplus

- Stand-alone:

$$\begin{aligned} CS^j(S) &= \left(p^j(S)\right)^2 CS^j(\beta c, \beta c) + \left(1 - p^j(S)\right)^2 CS^j(c, c) \\ &\quad + 2p^j(S)\left(1 - p^j(S)\right) CS^j(\beta c, c), \end{aligned}$$

where $j = o, u$, stands for observable or unobservable efforts.

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$$CS^j(M) = p^j(M)\, CS^j(\beta c) + \left(1 - p^j(M)\right) CS^j(c).$$

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Induced Social Welfare

- Stand-alone:

$$\begin{aligned} W^j(S) &= 2p^j(S)\left(1-p^j(S)\right)\left(\pi_1(\beta c, c)+CS(\beta c, c)\right) \\ &\quad +\left(p^j(S)\right)^2 CS(\beta c, \beta c)+ \\ &\quad \left(1-p^j(S)\right)^2 CS(c, c)-2\left(\frac{1}{2}\left(p^j(S)\right)^2\right), \end{aligned}$$

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- Merger:

$$\begin{aligned} W^j(M) &= p^j(M)\left(\pi(\beta c)+CS^j(\beta c)\right) \\ &\quad +\left(1-p^j(M)\right)\left(\pi(c)+CS^j(c)\right)-2\left(\frac{1}{2}\left(e^j(M)\right)^2\right). \end{aligned}$$

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Efficiency vs. Consumers' Surplus

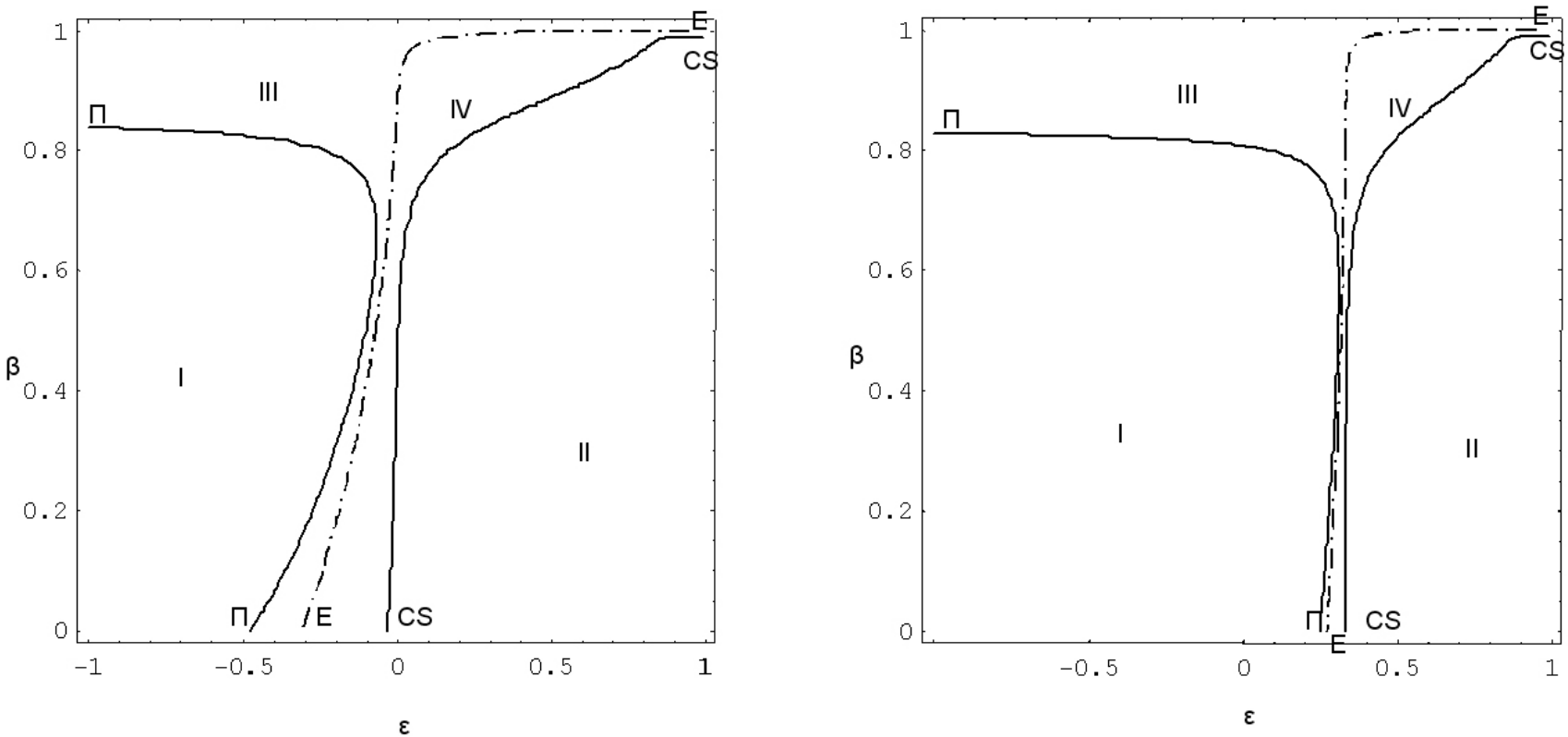


Fig. 2: No moral hazard vs. moral hazard for $c = 0.99$

Efficiency vs. Consumers' Surplus

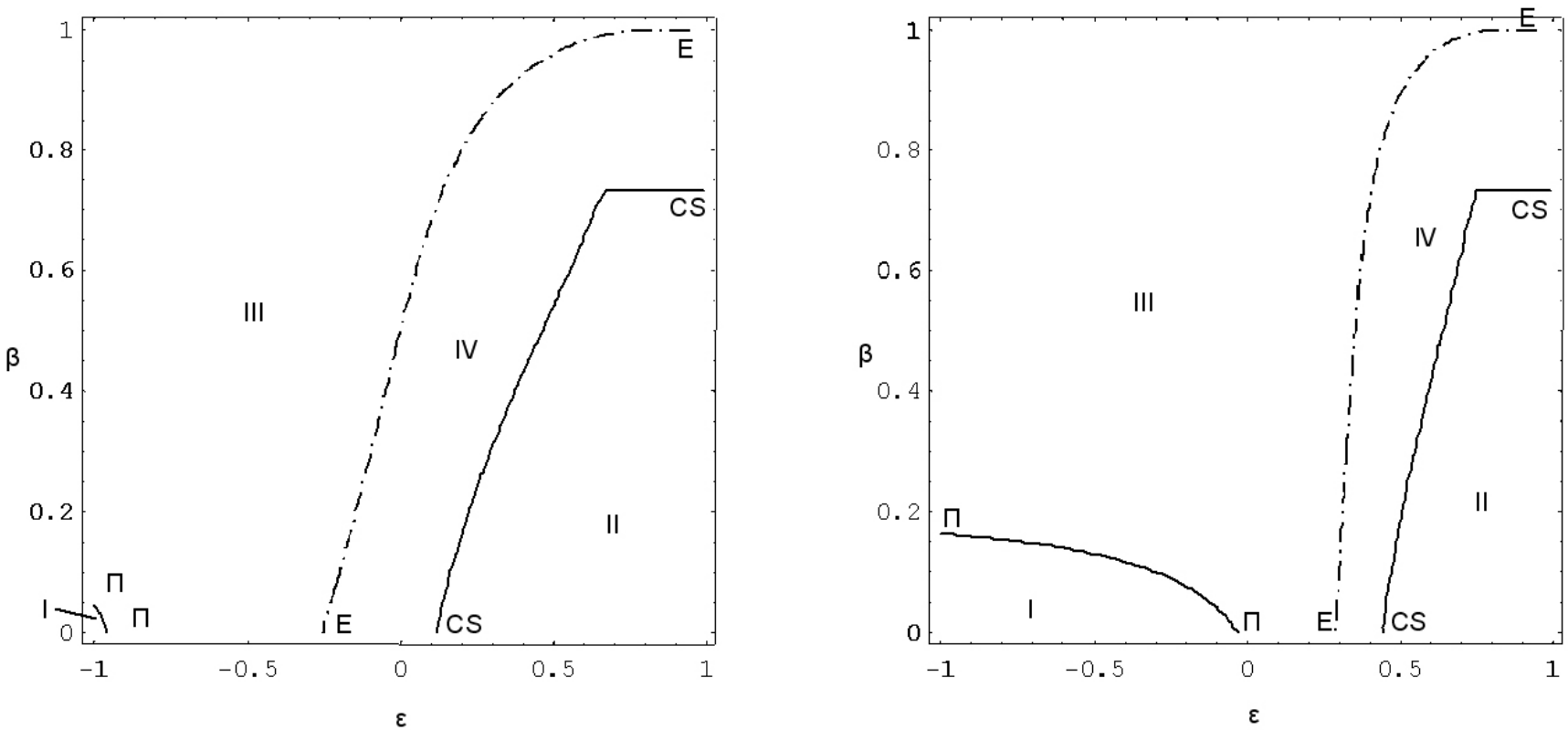


Fig. 3: No moral hazard vs. moral hazard for $c = 0.79$

Efficiency vs. Social Welfare

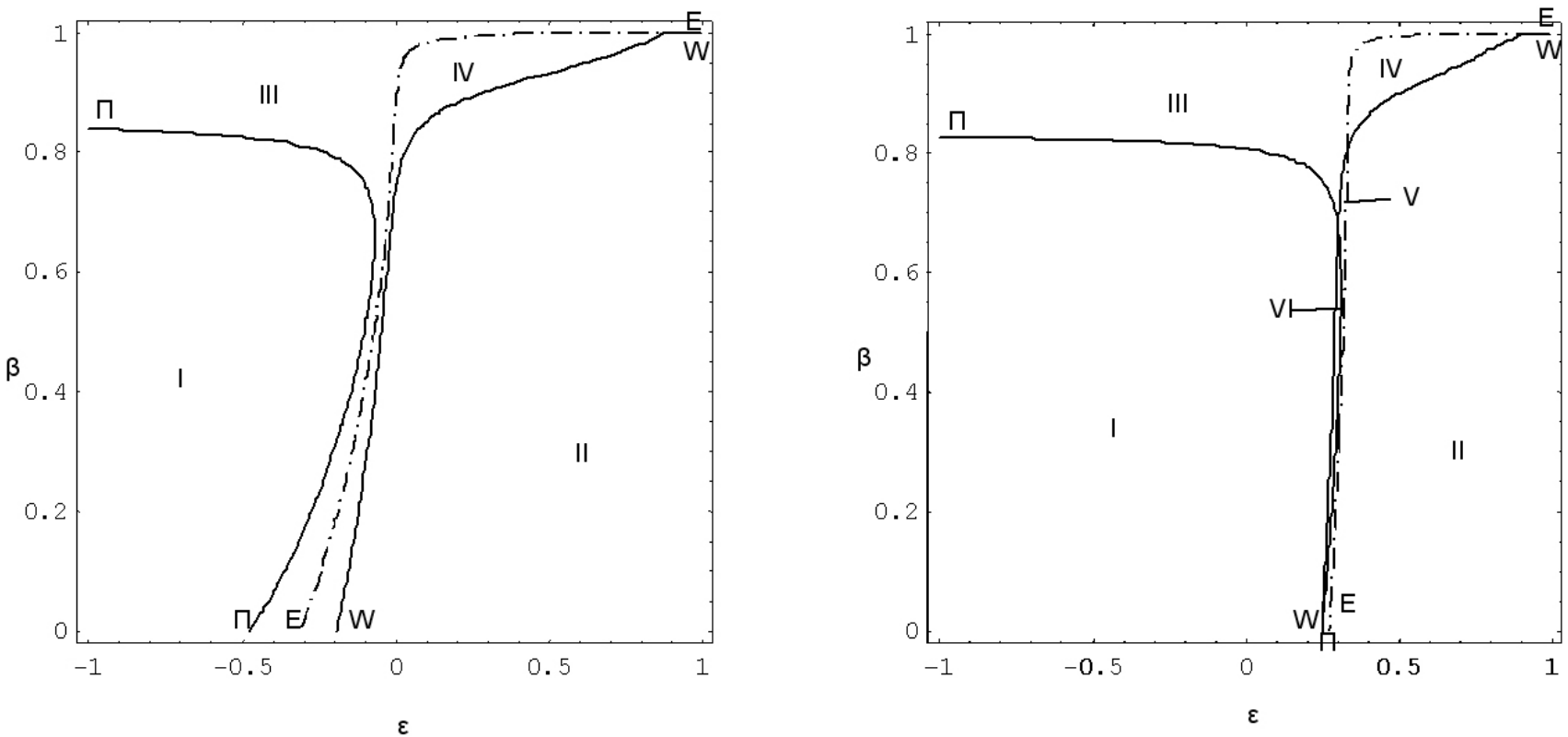


Fig. 4: No moral hazard vs. moral hazard for $c = 0.99$

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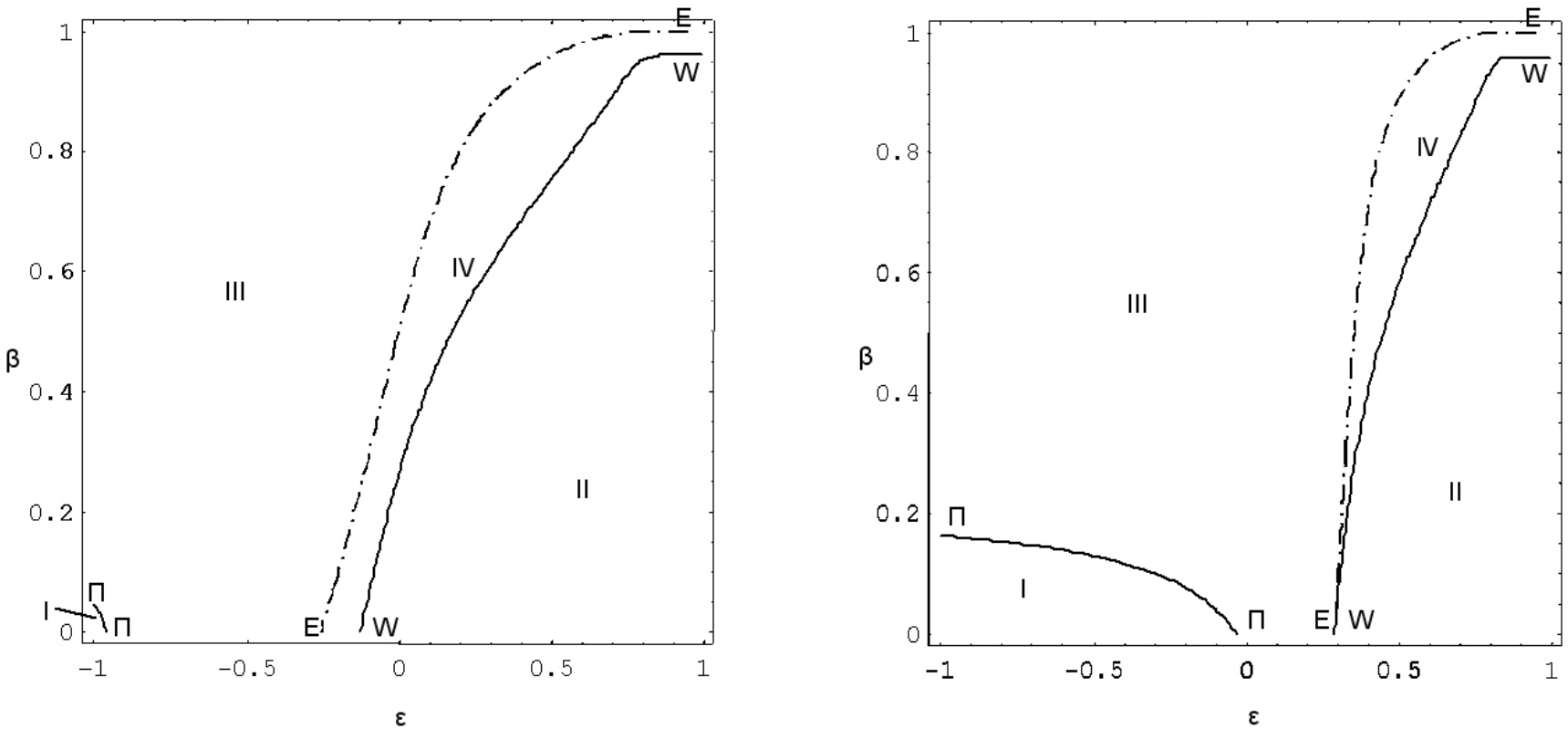


Fig. 5: No moral hazard vs. moral hazard for $c = 0.79$

Price Reductions vs. Consumers' Surplus

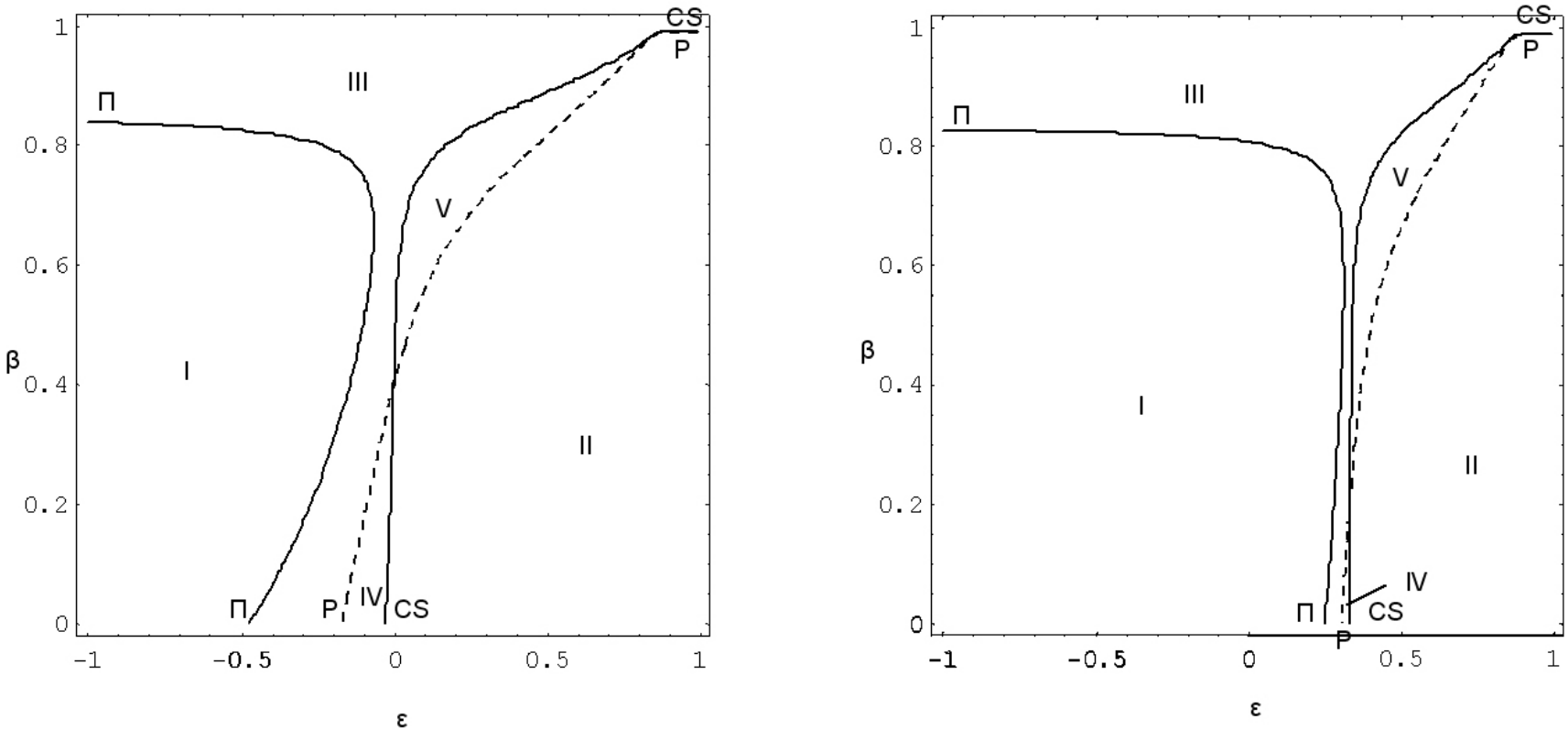


Fig. 6: No moral hazard vs. moral hazard for $c = 0.99$

Price Reductions vs. Consumers' Surplus

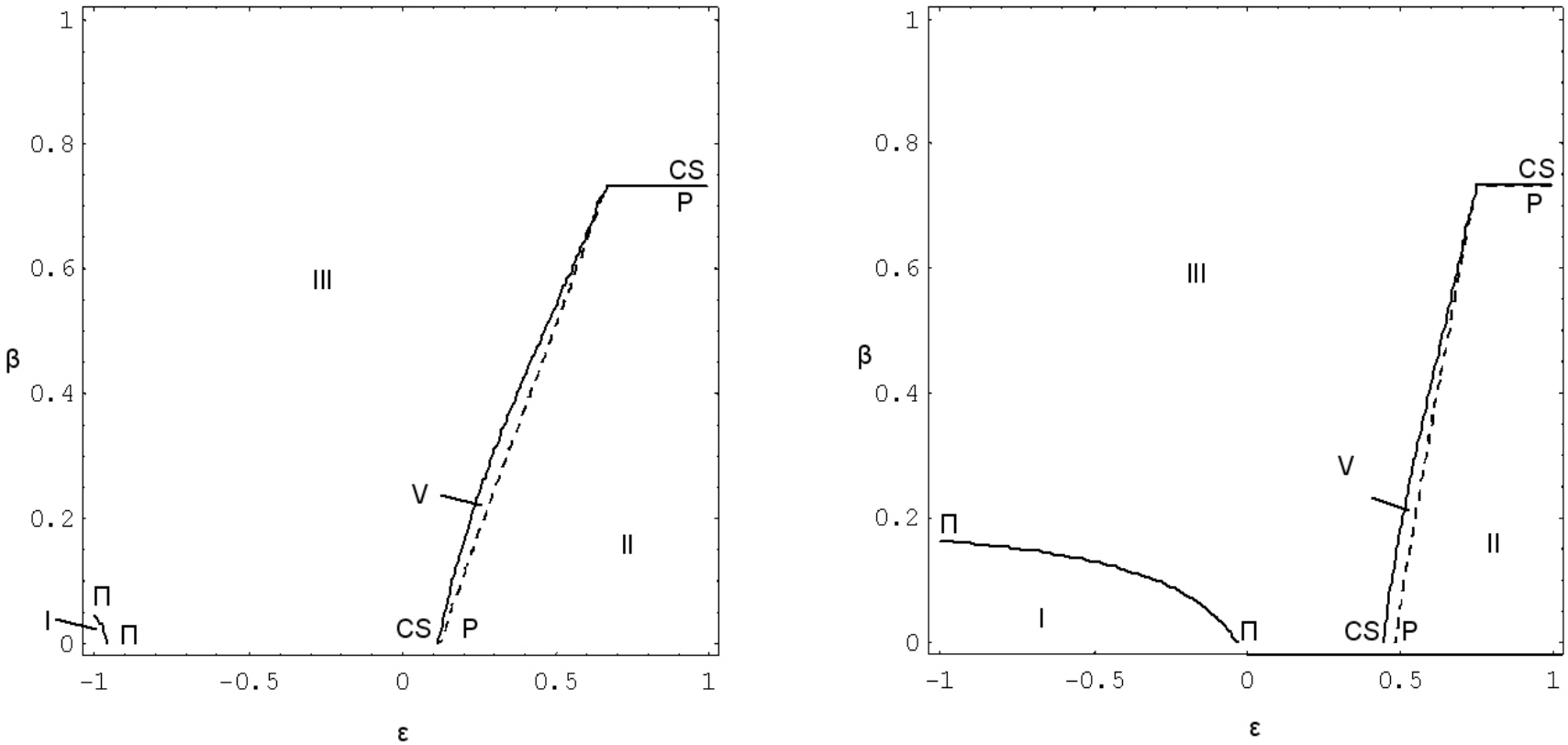


Fig. 7: No moral hazard vs. moral hazard for $c = 0.79$

Price Reductions vs. Social Welfare

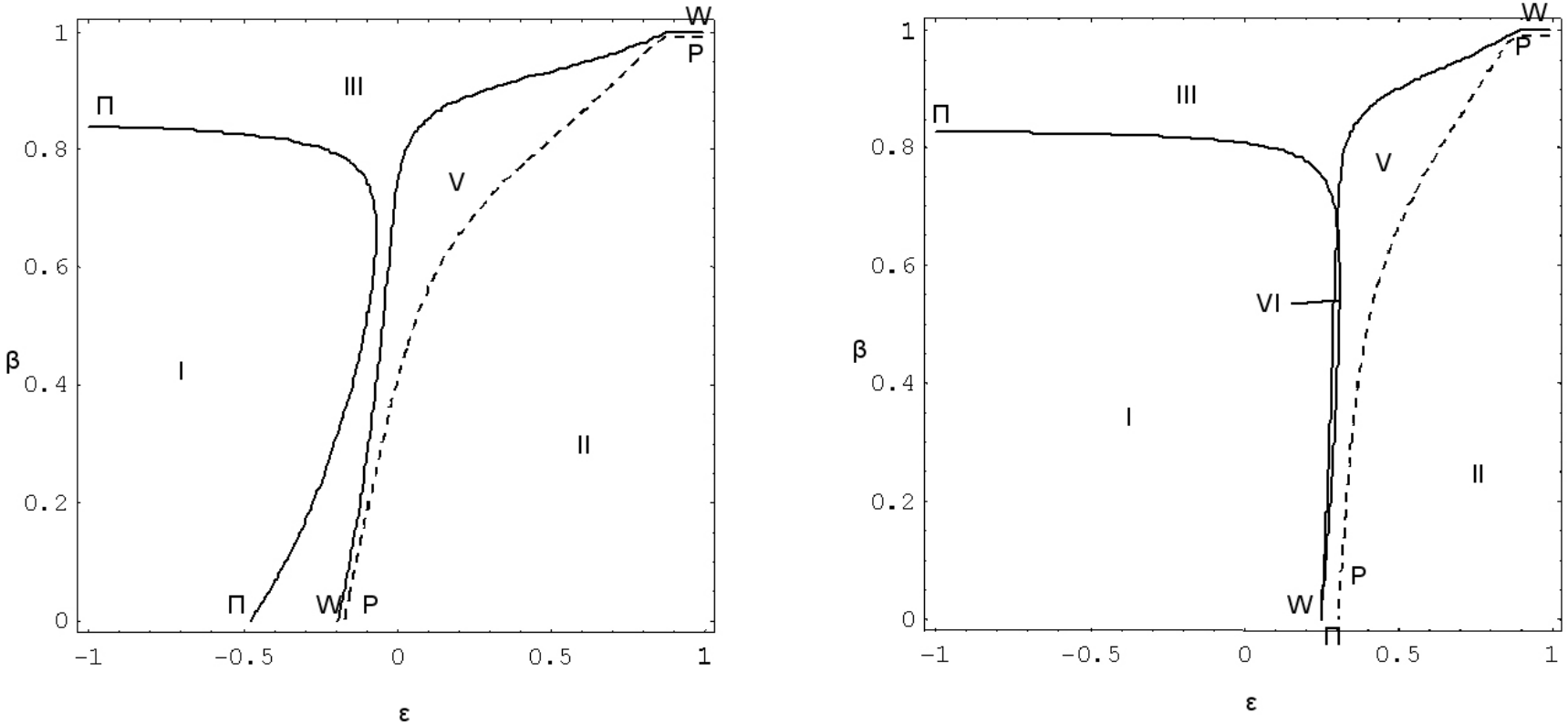


Fig. 8: No moral hazard vs. moral hazard for $c = 0.99$

Price Reductions vs. Social Welfare

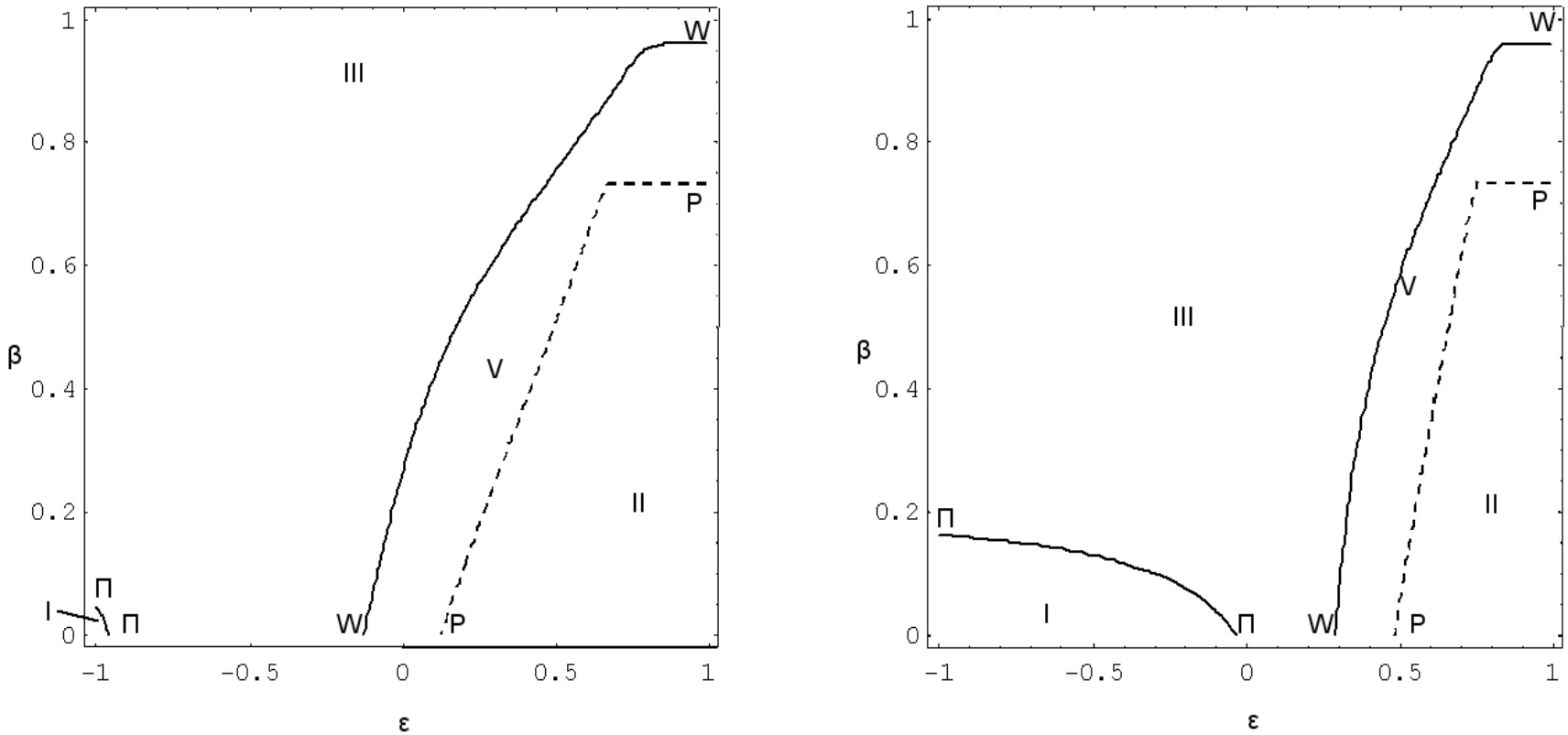


Fig. 9: No moral hazard vs. moral hazard for $c = 0.79$

PROPOSITION 1: *If low synergies are present (ε small or bigger than one, i.e. efforts are not close substitutes), the firms choose more often to merge under moral hazard than with observable efforts. For higher synergies (ε around zero, i.e. efforts are close substitutes), the firms choose less often to merge under moral hazard than with observable efforts.*

PROPOSITION 2: *If a competition authority adheres to a (CS) standard and relies on expected efficiency gains for judging proposed mergers:*

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1. *Under no MH, type I errors are systematically committed, i.e. bad mergers are accepted, unless significant expected efficiency gains are required;*

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2. *Under MH, type I errors are committed as well, but they occur less often than under the no MH assumption; for high initial costs the requirement of significant expected efficiency gains would lead to type II errors in addition, i.e. some good mergers would be rejected.*

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2. *Under MH, type I errors are committed for smaller regions than under the* (CS) *standard, but type II errors can be committed in addition unless the potential for cost savings is low, i.e.* $\beta > 0.8$*. For high and moderate initial cost asking for substantial efficiency gains would lead to refuse some good mergers, i.e. type II errors are committed in addition.*

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2. *Under MH, type I errors are committed as well, but to a lower extent than under the no MH assumption and only for high initial costs. In addition, type II errors are made regardless of the level of the initial costs, i.e. the requirement is overall too strict.*

PROPOSITION 5: *If a competition authority adheres to a* (W) *standard and relies on reductions in the expected prices for judging proposed mergers: under no MH and MH assumptions, type II errors are systematically committed, i.e. some good mergers are rejected regardless of the level of the initial costs.*

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- Corollary 2: *Under MH, the expected price proxy is better calibrated to both standards than under no MH.*

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  - An efficiency defense based on potential efficiency gains due to a merger is too lax a requirement; substantial efficiency gains may reduce this distortion, but in the presence of moral hazard, may inhibit good mergers as well;
  - An efficiency defense based on potential efficiency gains due to a merger which are passed on to consumers, via price reductions, is too strict a requirement.