

Liability Experiments: Seller's or Buyer's?

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1. Introduction and Summary

Basic Question: Is Emissions Trading really **Cost-Effective**?

Our Previous Experiments

Experiment 1: (13 sessions, 78 subjects, 1998)

- *Reversible and No Time Lag Investment*
- *Seller's Liability*

=> **Extremely High Efficiency**

Experiment 2: (12 sessions, 72 subjects, 1999)

- *Irreversible and Time Lag Investment*
- *Seller's Liability*

=> Two Cases:

(1) **Success Case** and (2) **Bubble Case**

Our Focus is

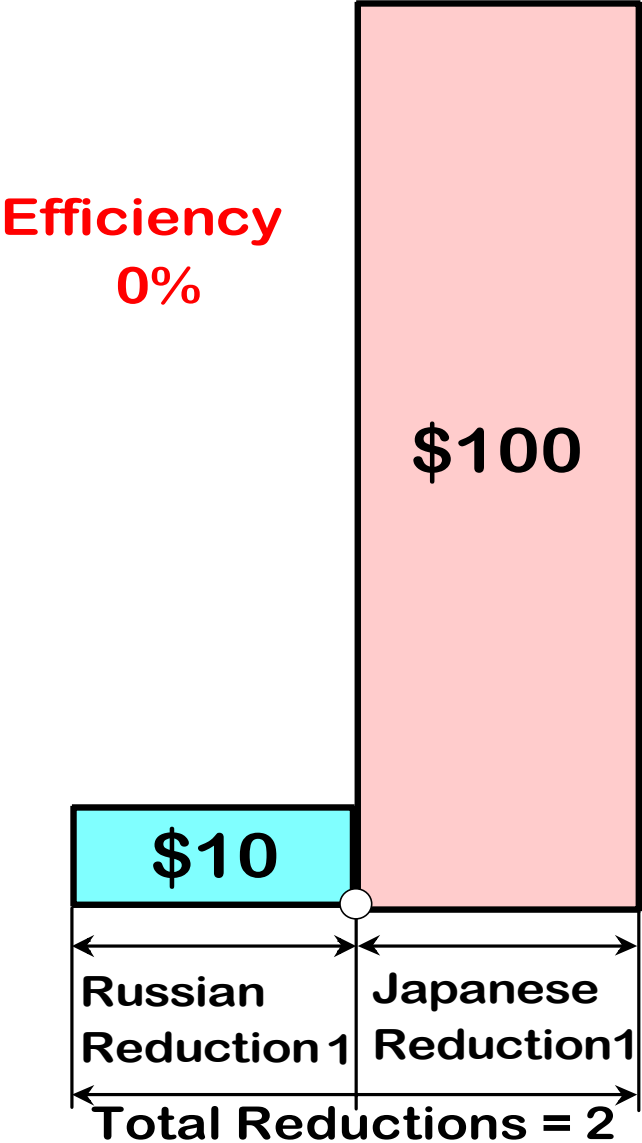
Experiment 3: (18 sessions, 90 subjects, 2001)

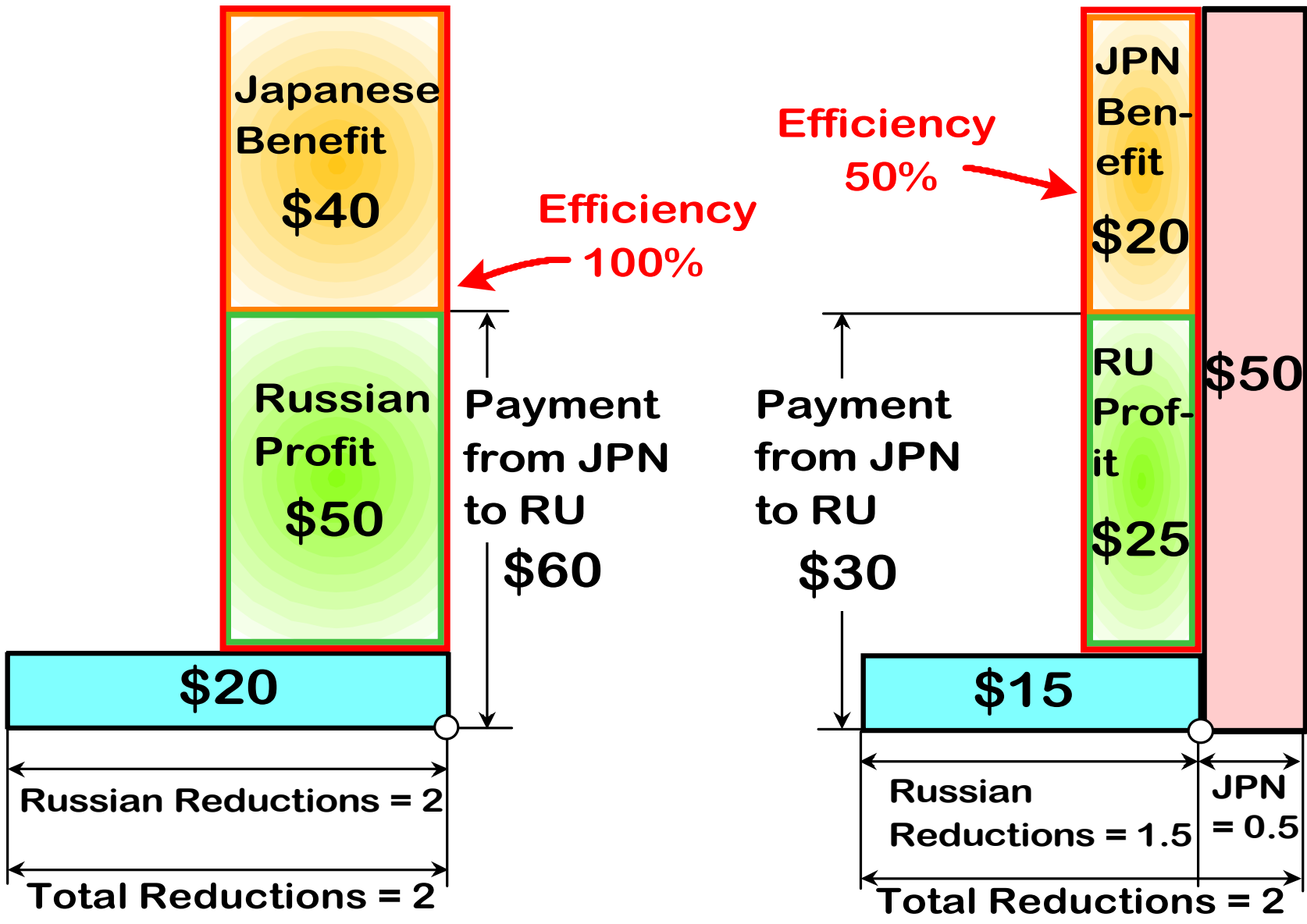
- *Irreversible and Time Lag Investment*
- *Seller's vs. Buyer's Liability*

Two **Buyer's Liability** Systems: (the order is VERY important!)

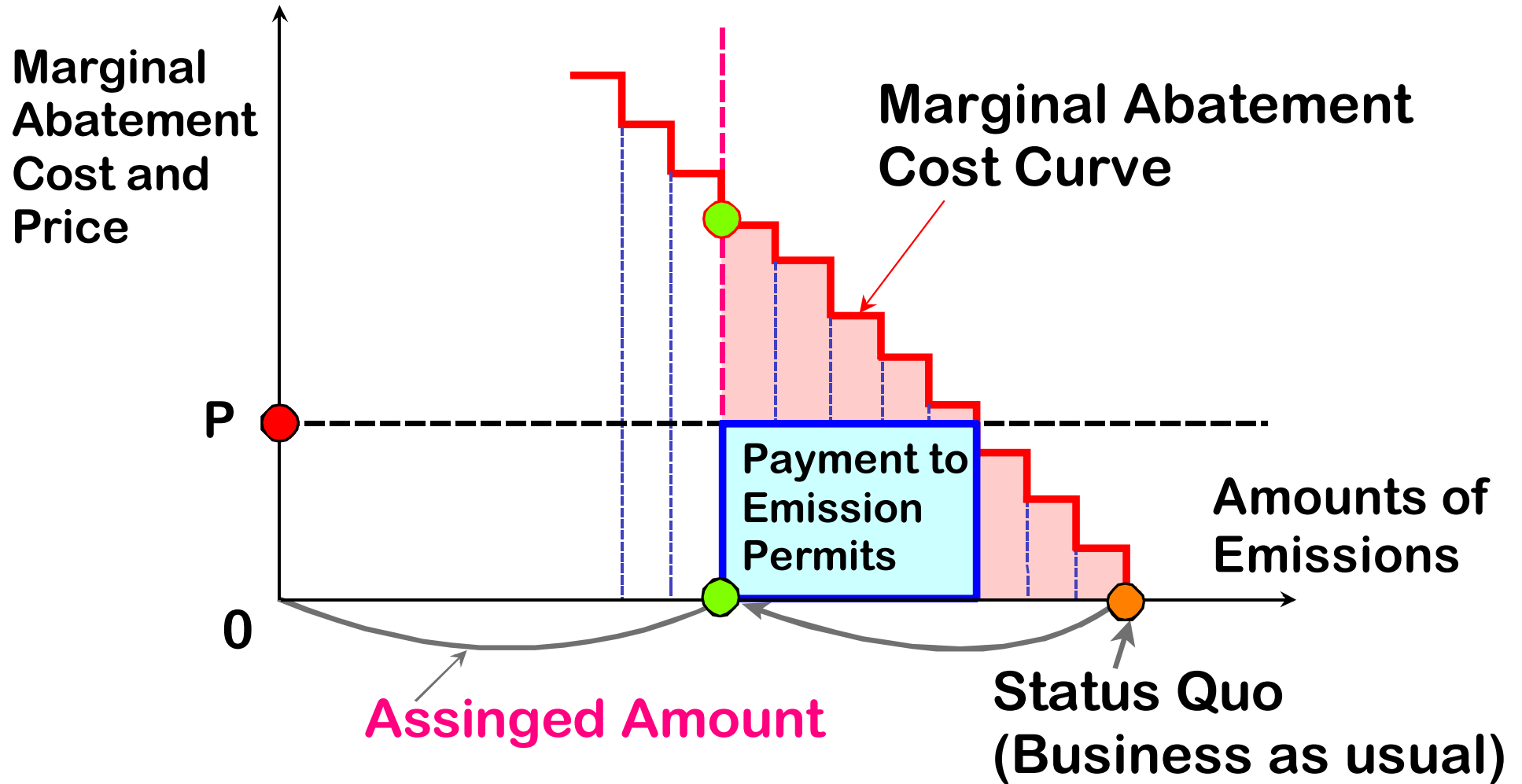
- **Kyoto-First:** Retire Permits to Compliance Committee
=> Settle promises among countries
- **Country-First:** Settle promises among countries
=> Retire Permits to Compliance Committee

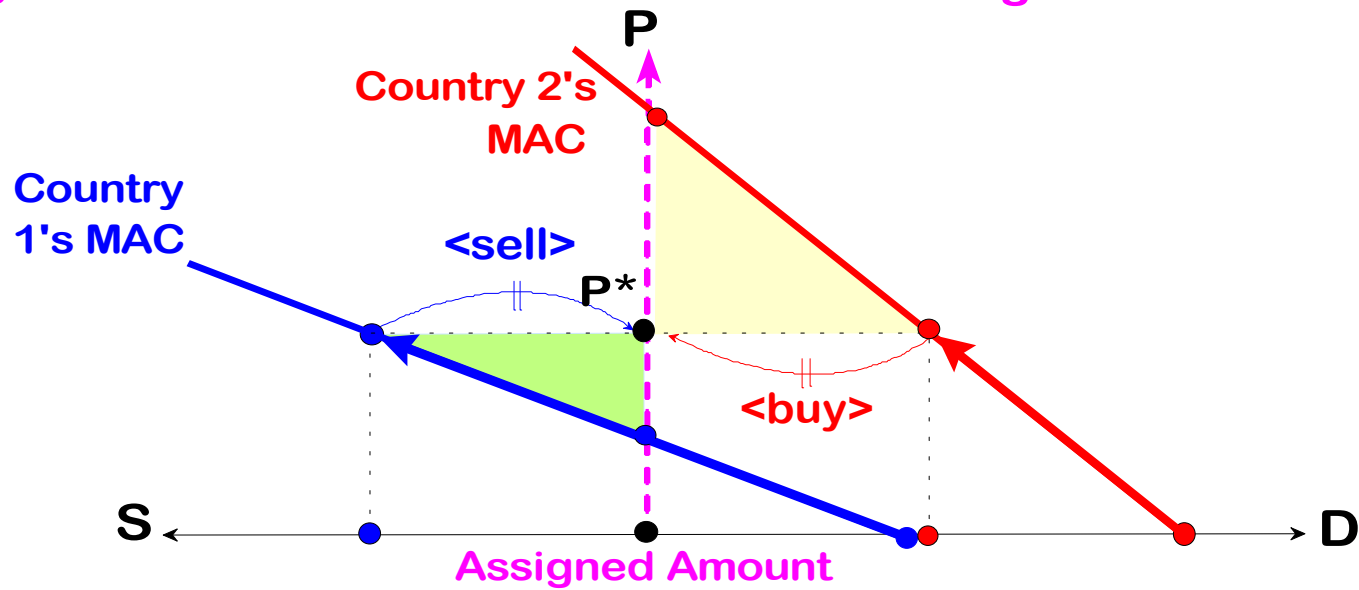
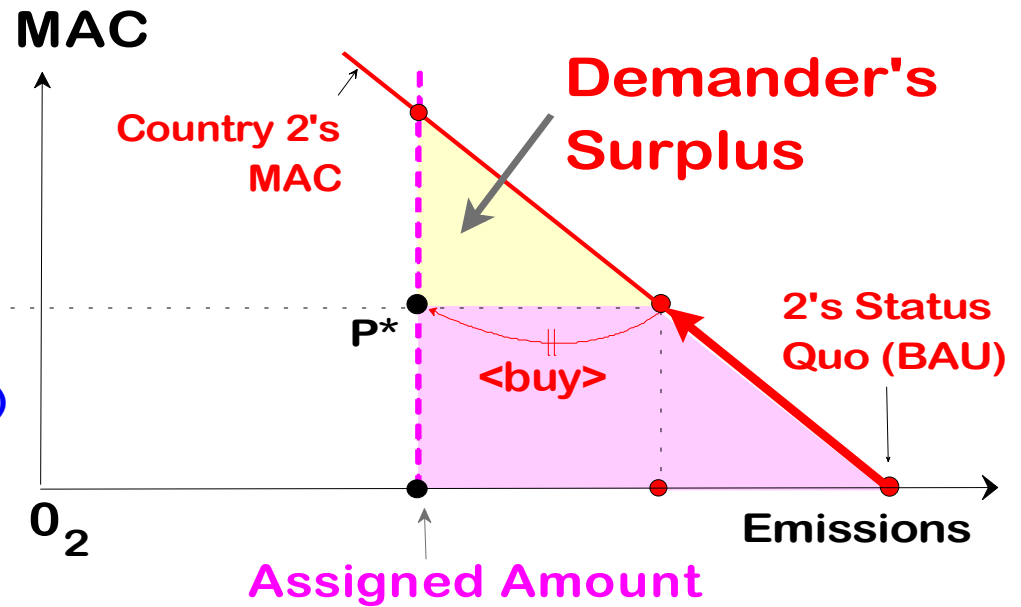
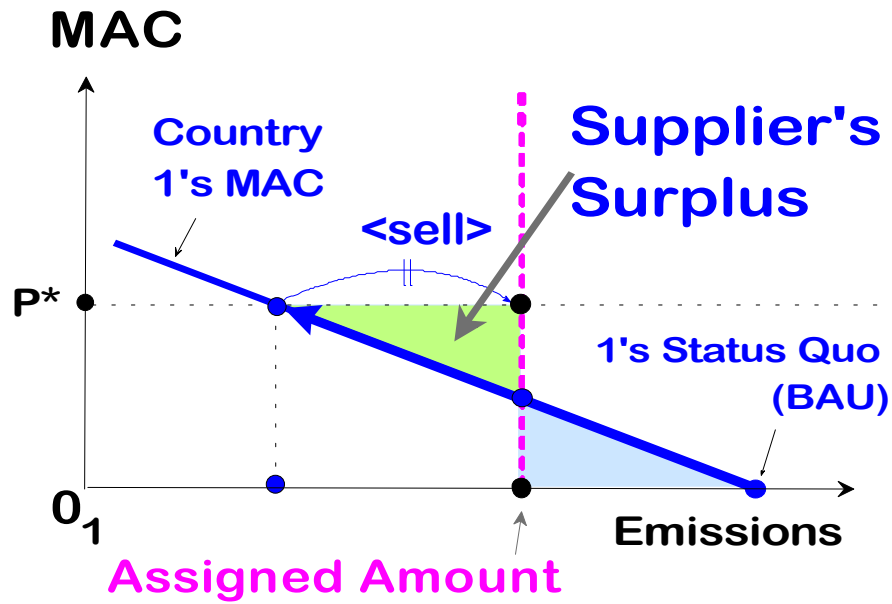
2. Emissions Trading





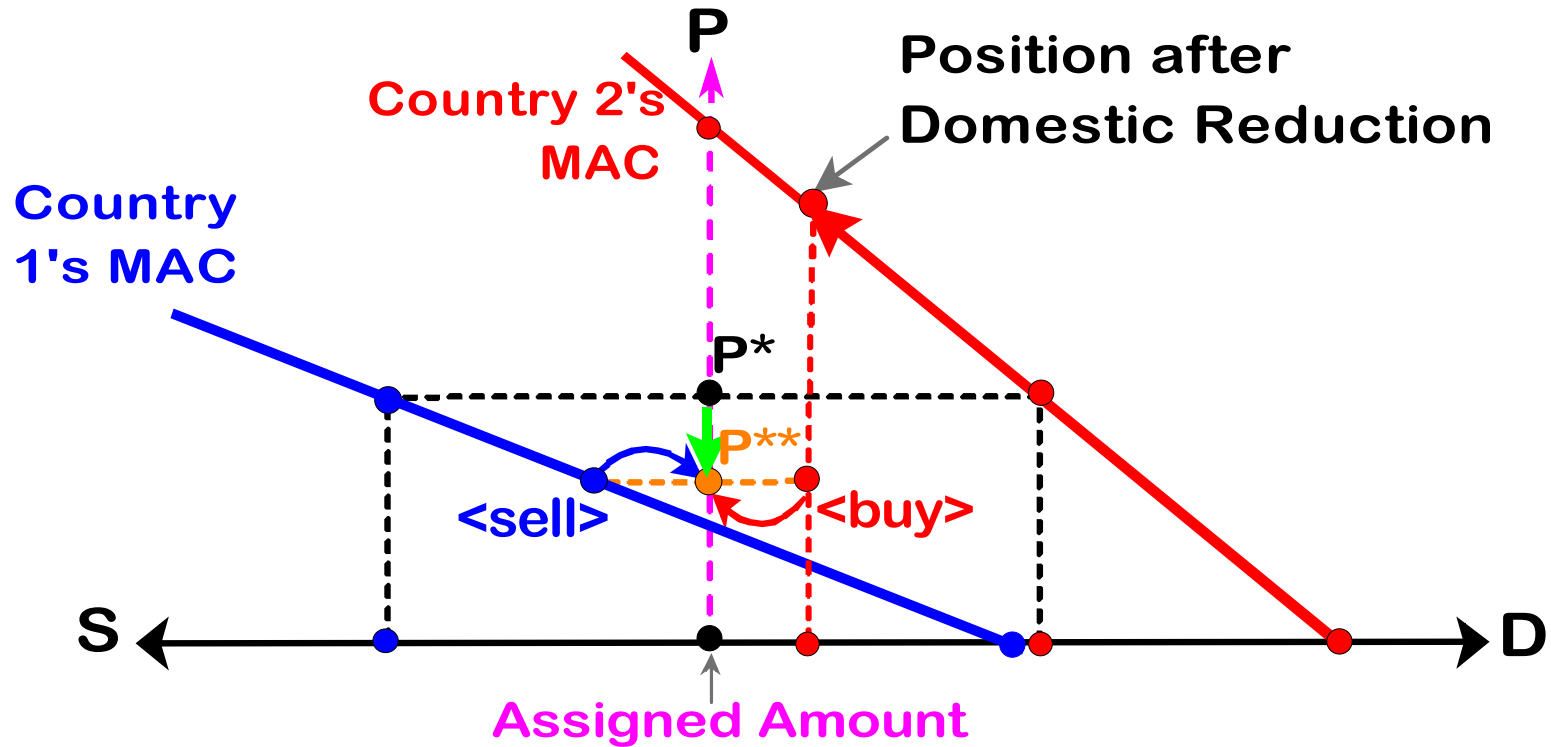
Marginal Abatement Cost Curve





3. Point Equilibrium

Excessive reduction → Price drops



Point Equilibrium Price:
Market clearing price at each point of time

4. Experimental Design for Experiment 3

Common features to all sessions

- Ten student subjects in each session
- Used realistic marginal abatement cost curves
- Every subject could be **a buyer and a seller** depending on the prices. Bohm (1997)
- We paid subjects money that was proportional to the earnings in experiment.

Experimental Controls: Trading Methods and Information

- **Bilateral Trading**: A pair negotiates the price and quantity
vs.

- **Double Auction**:

	Buyers' Bids	Sellers' Asks
	(3) \$56, 20 units	(6) \$104, 15 units
	(1) \$86, 13 units	(4) \$92, 20 units
	(2) grabs (4)'s ask	
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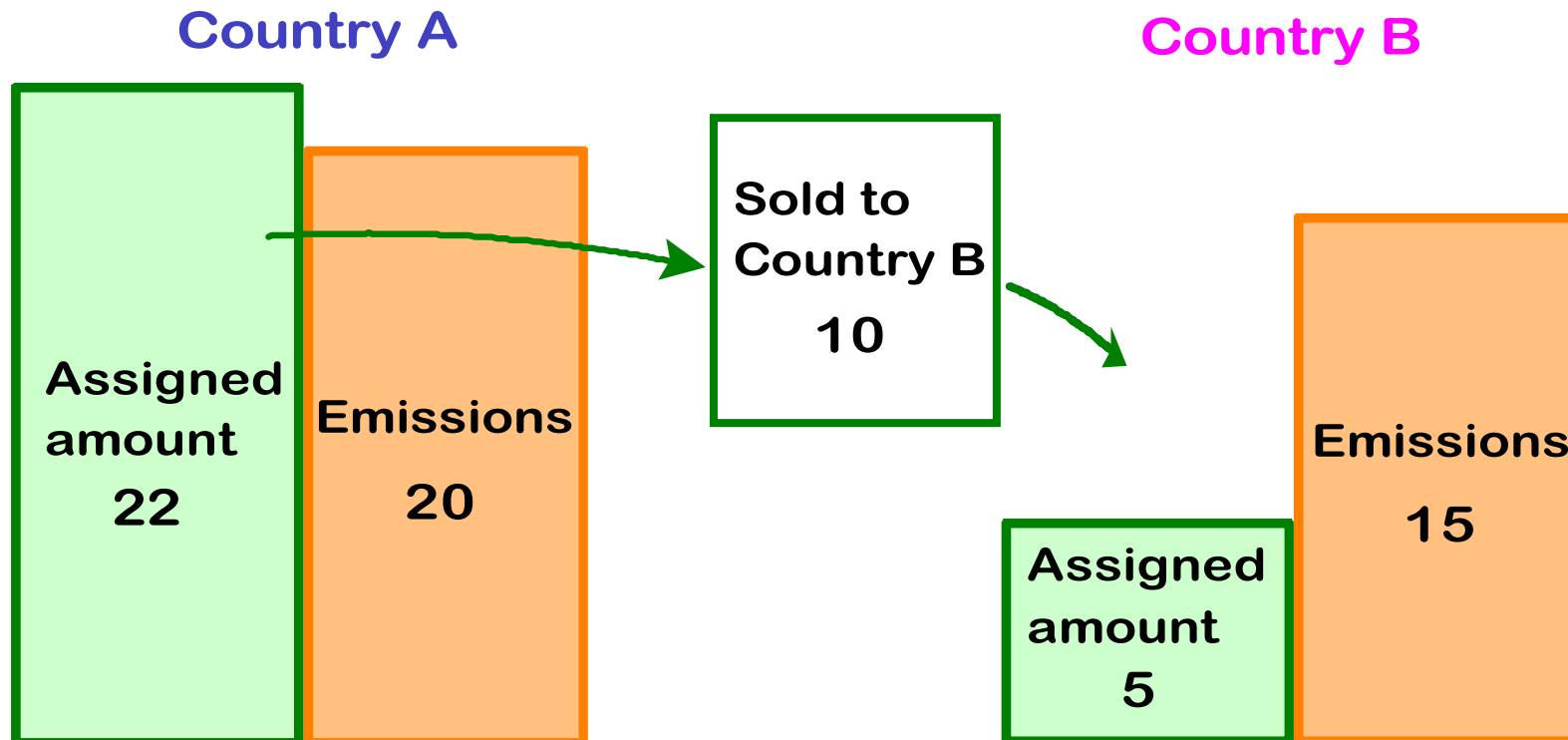
Trading Methods

Information of contracts
(subject #, p and q)

	Bilateral Trading	Double Auction
Open		
Closed		-----

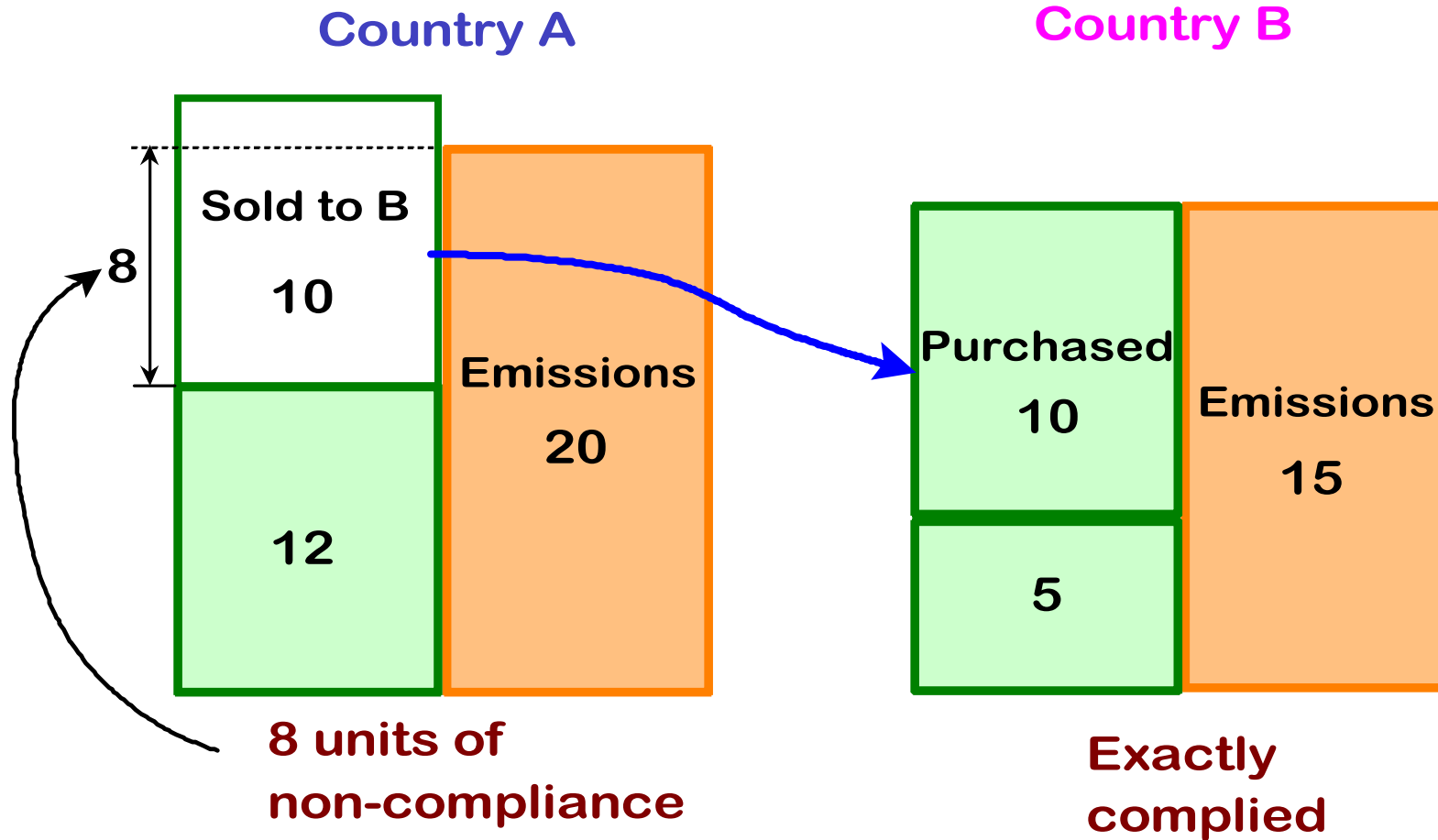
5. Experimental Control: Liabilities

Seller's Liability vs. **Buyer's Liability**



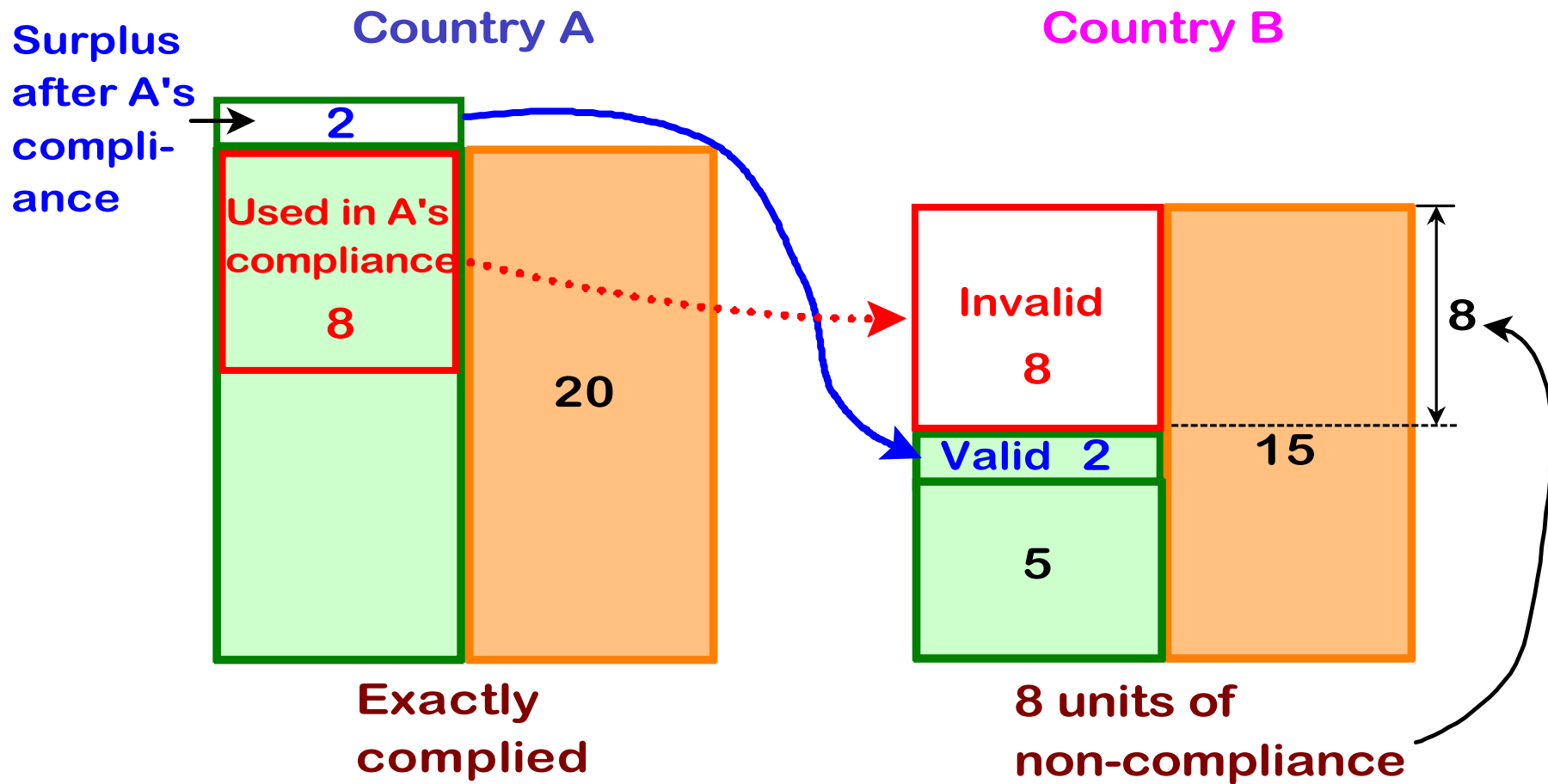
Seller's liability

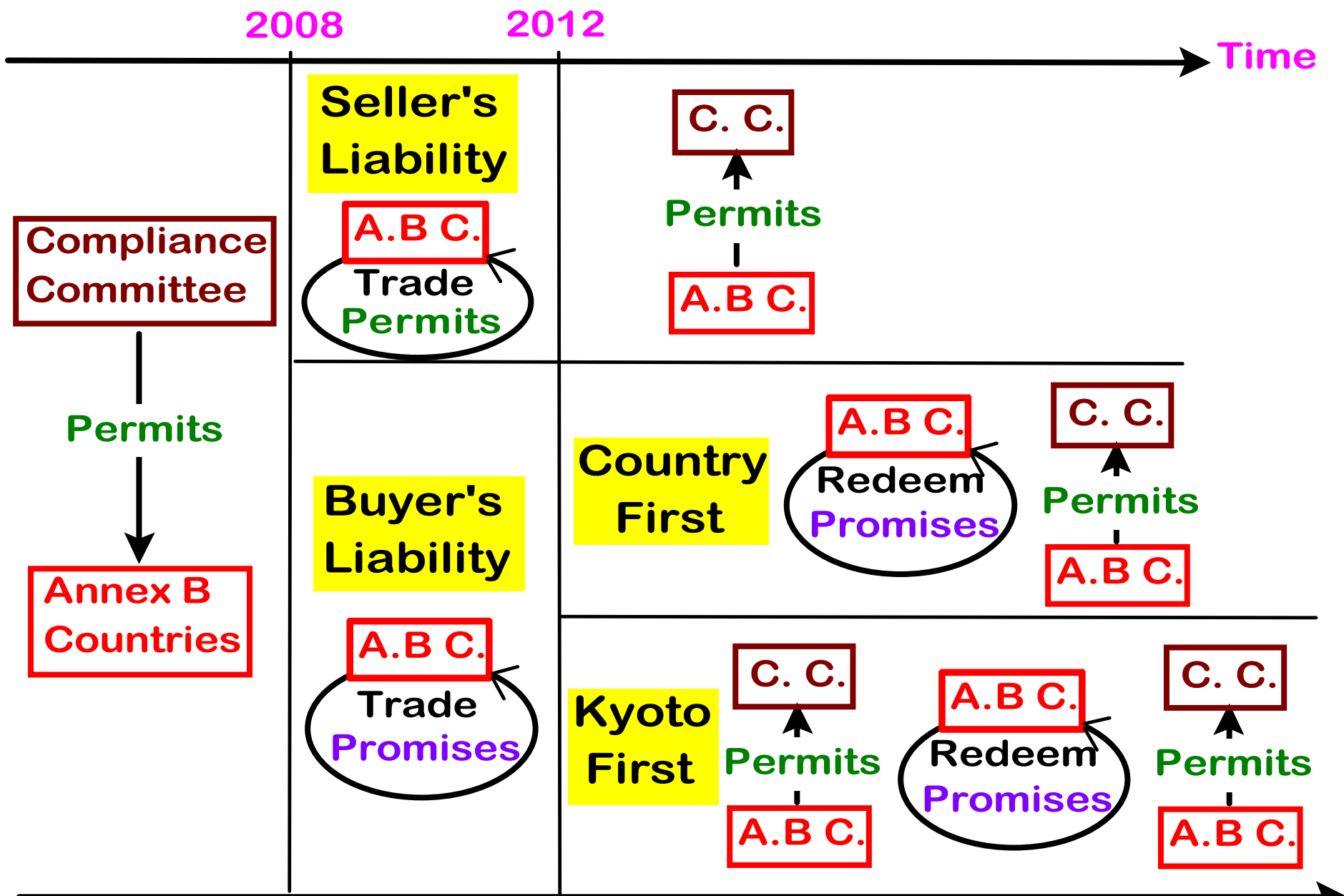
All the units purchased are **absolutely valid** for the buyer.



Buyer's liability (Kyoto-First)

Some units purchased **may be invalid** for the buyer.





Other Rules

Default:

No monetary compensation

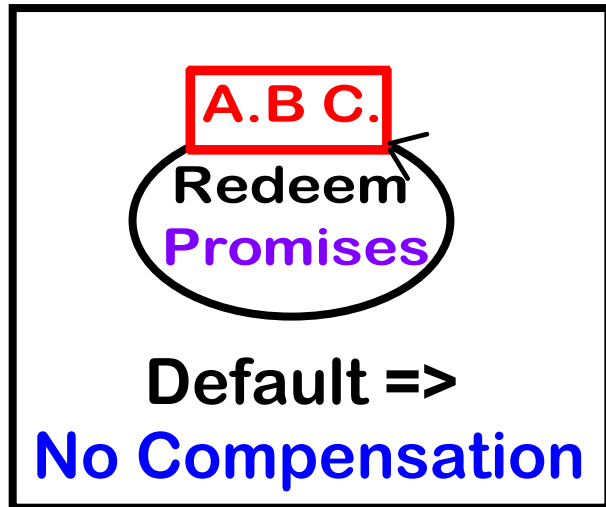
Non-compliance:

Penalty of \$250 per unit => No Borrowing

Over-compliance:

Surplus has no value => No Banking

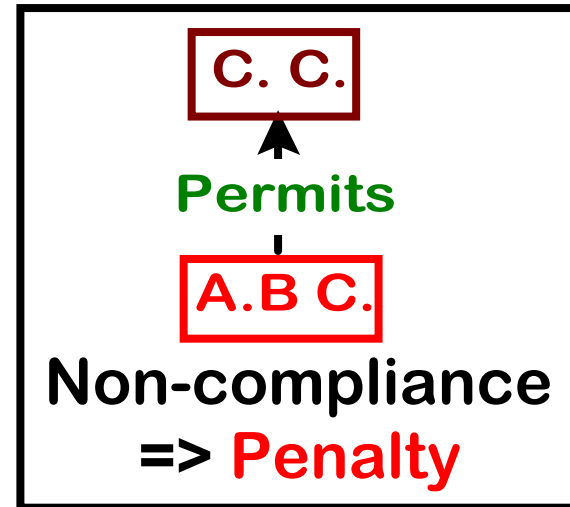
• Is Over-Selling beneficial?



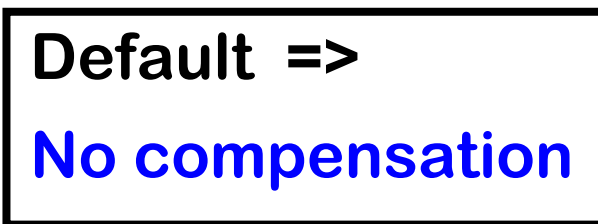
Country-First



Kyoto-First



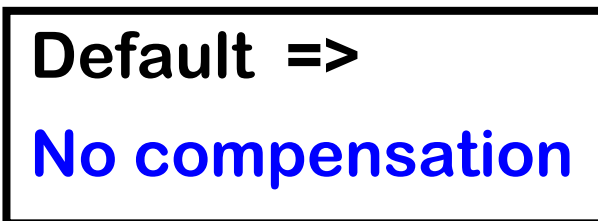
When a country sold more bonds than her assigned amount,



Country-First



Not quite



Kyoto-First

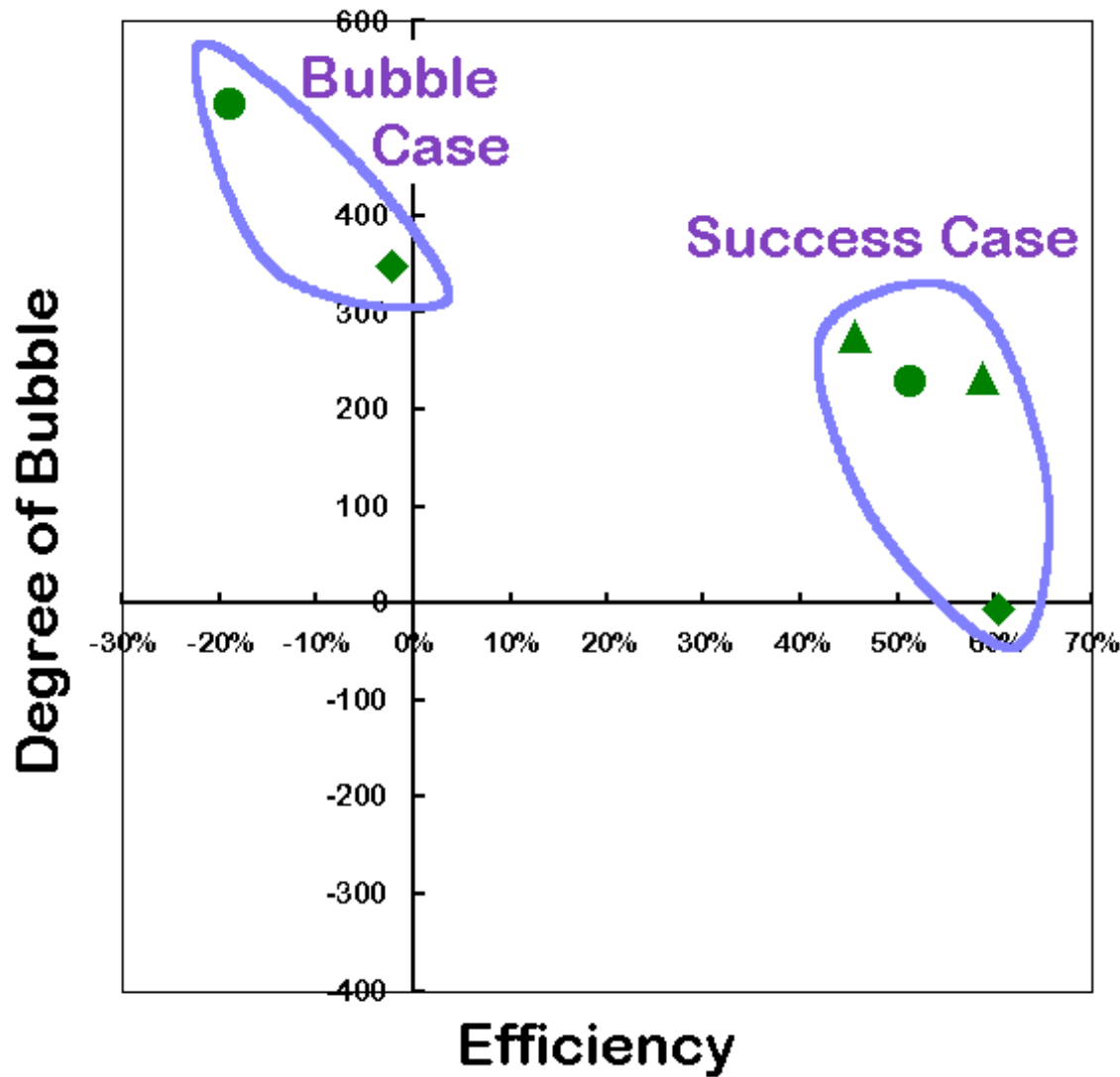


Yes!



5. Results

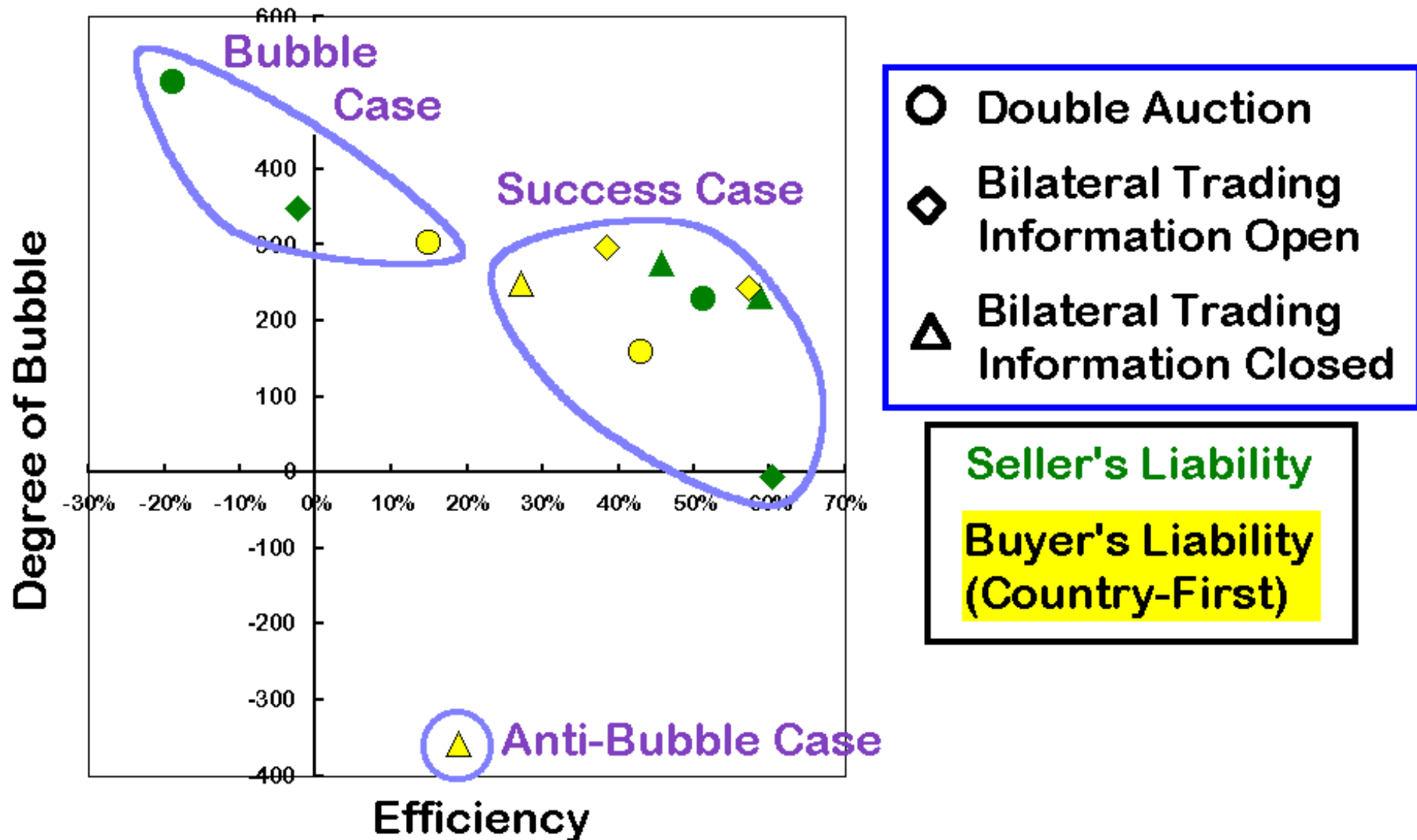
Seller's Liability: Two Cases



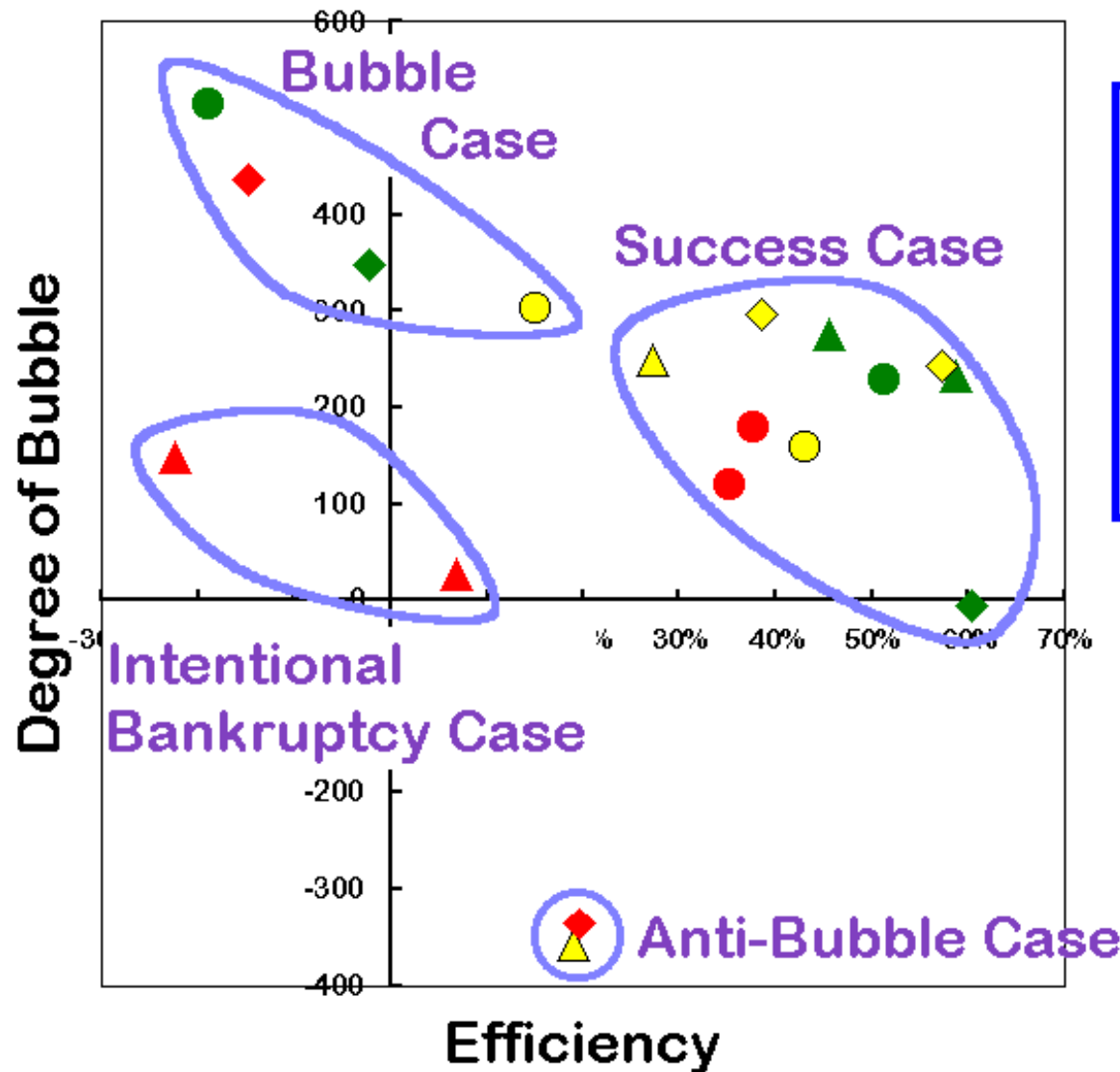
- Double Auction
- ◇ Bilateral Trading Information Open
- △ Bilateral Trading Information Closed

Seller's Liability

Country-First Buyer's Liability: Three Cases



Kyoto-First Buyer's Liability: Four Cases

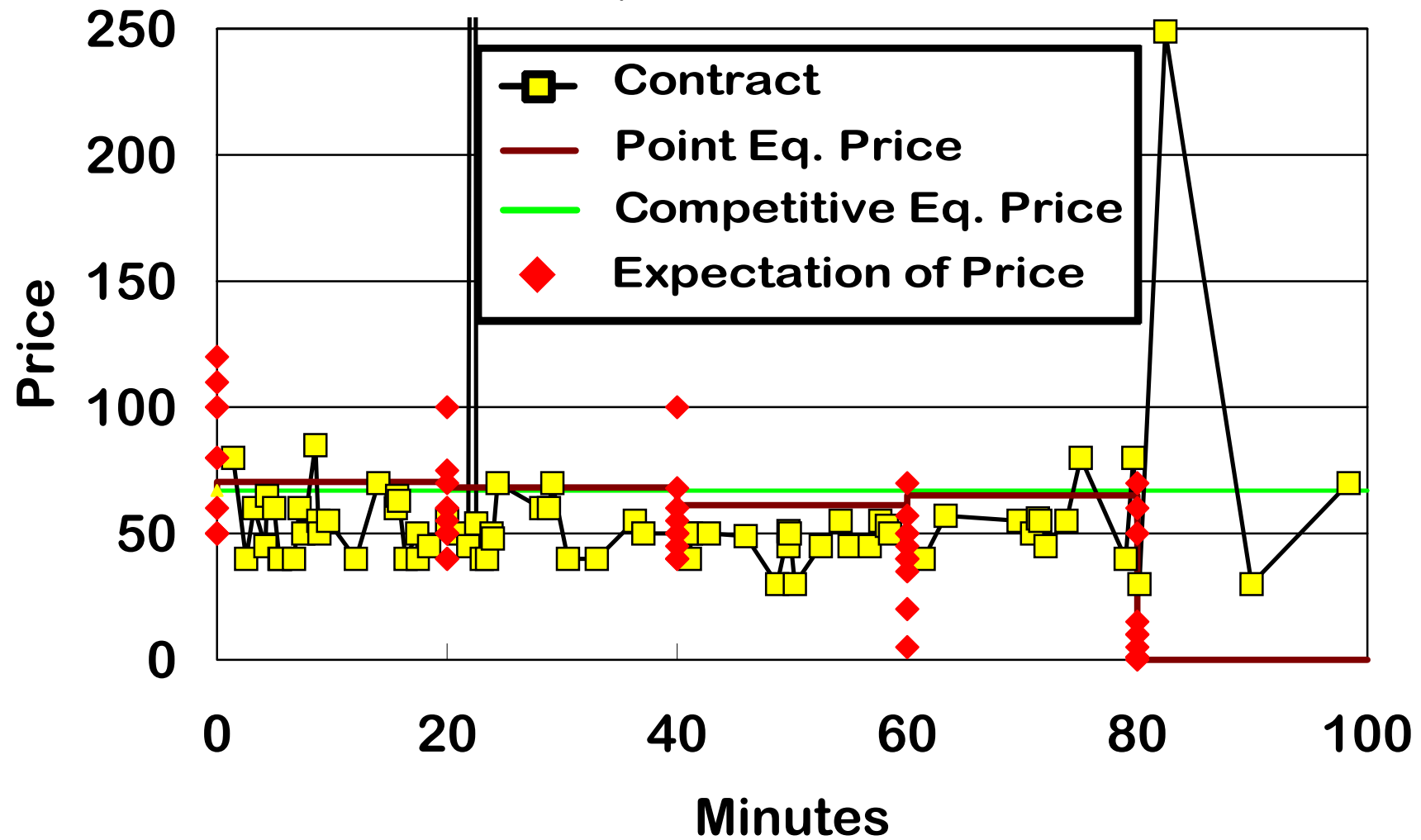


- Double Auction
- ◇ Bilateral Trading Information Open
- △ Bilateral Trading Information Closed

- Seller's Liability
- Buyer's Liability (Country-First)
- Buyer's Liability (Kyoto-First)

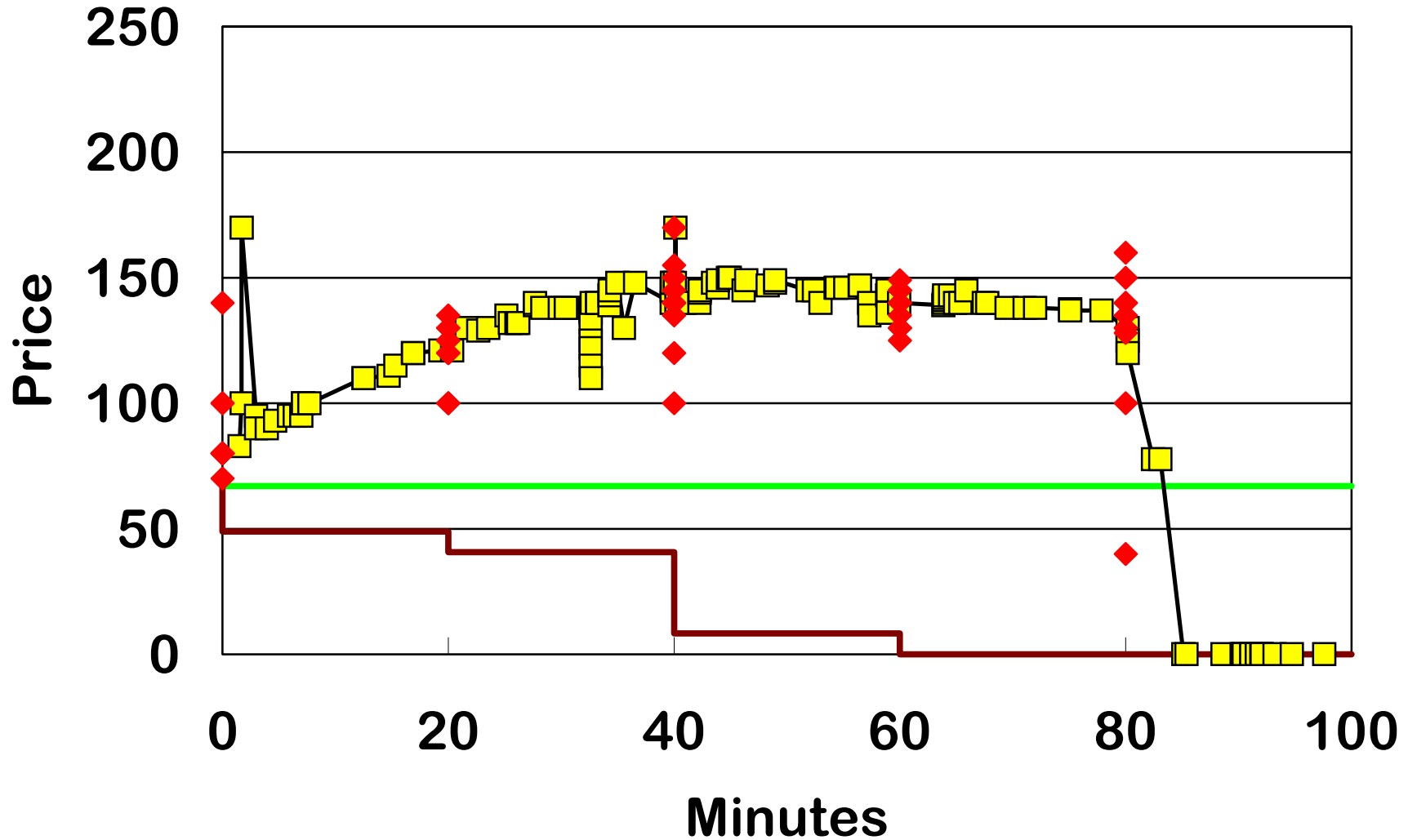
Success Case

Seller's Liability, Bilateral Trading Information Open, Second Session



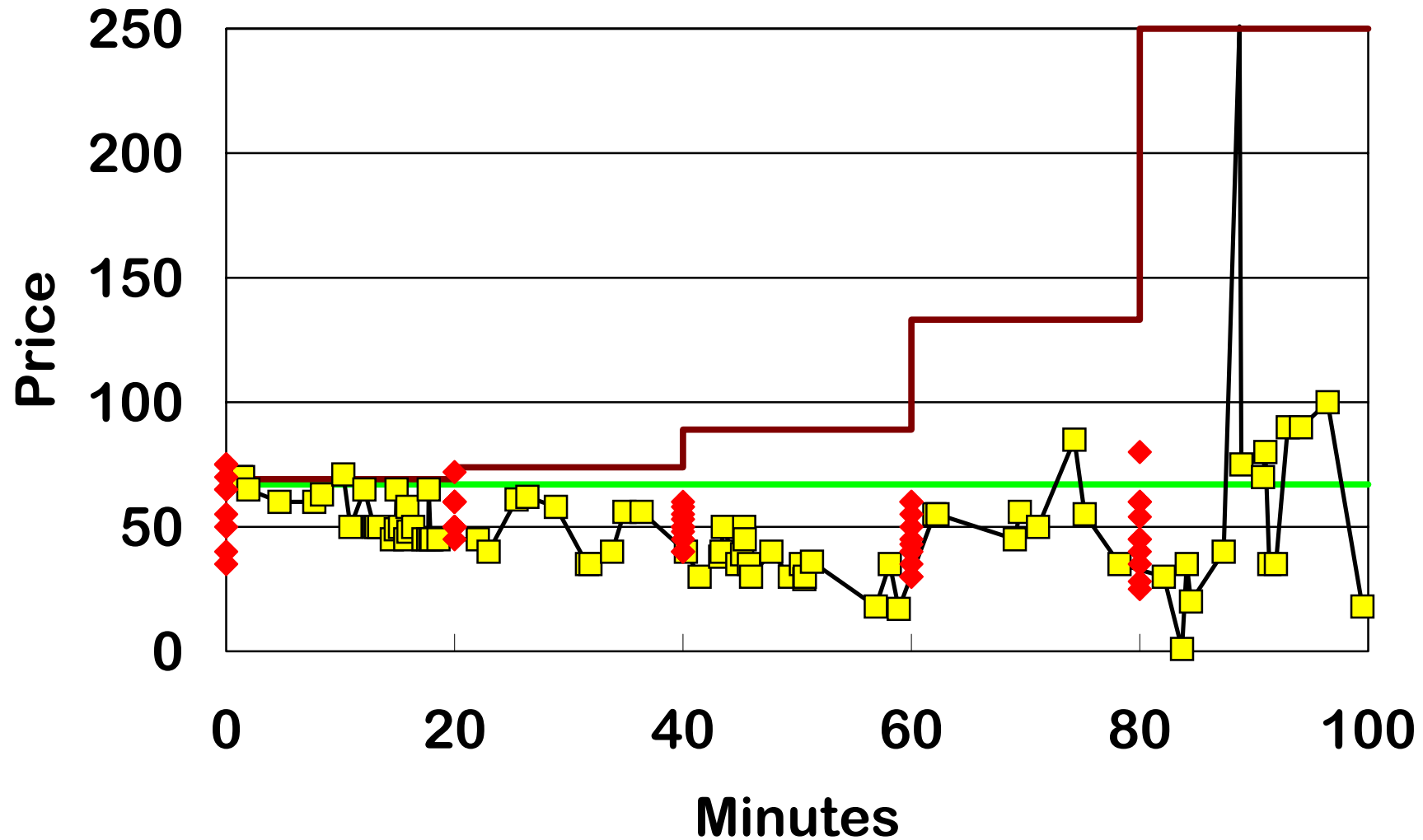
Bubble Case

Seller's Liability, Double Auction, Second Session



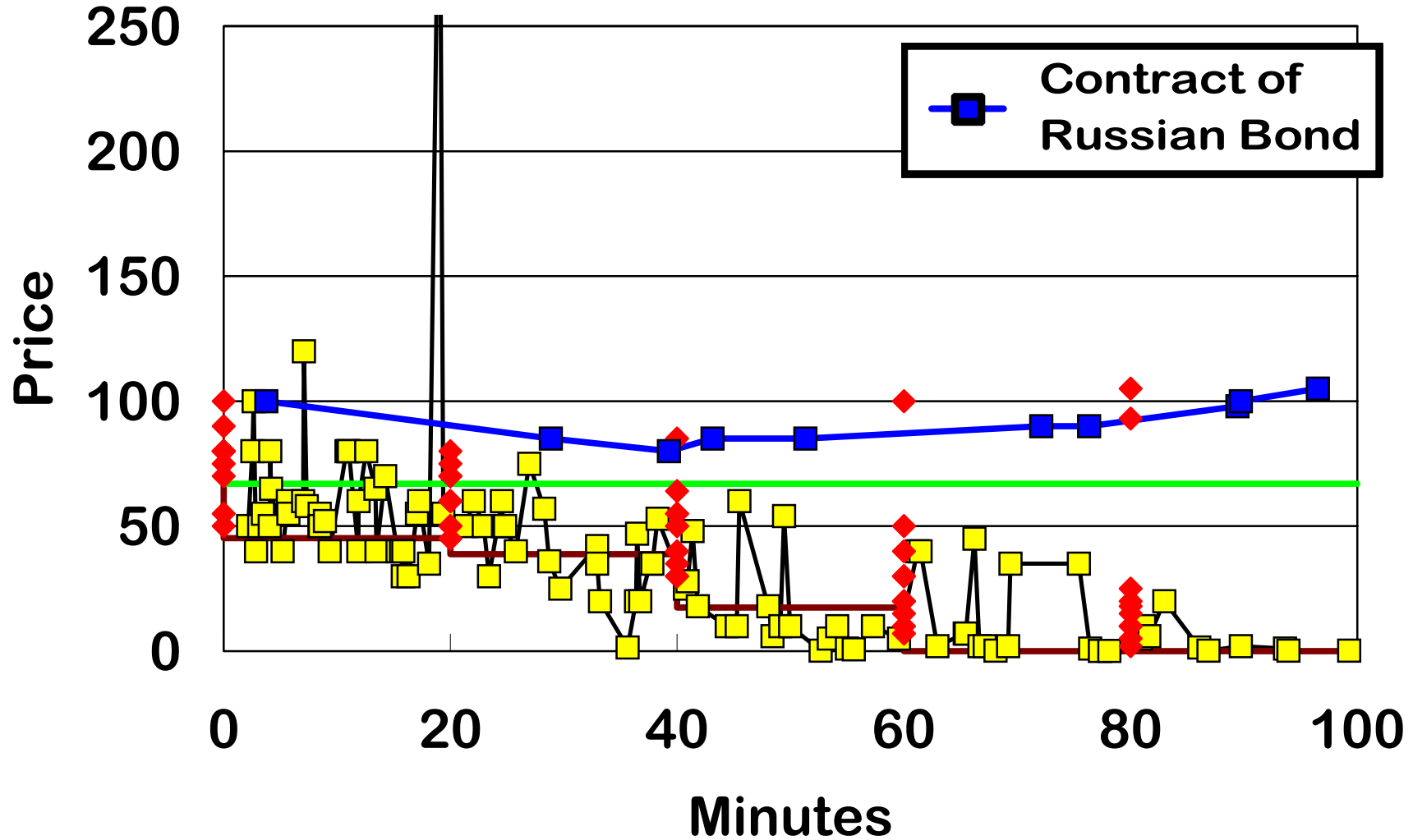
Anti-Bubble Case

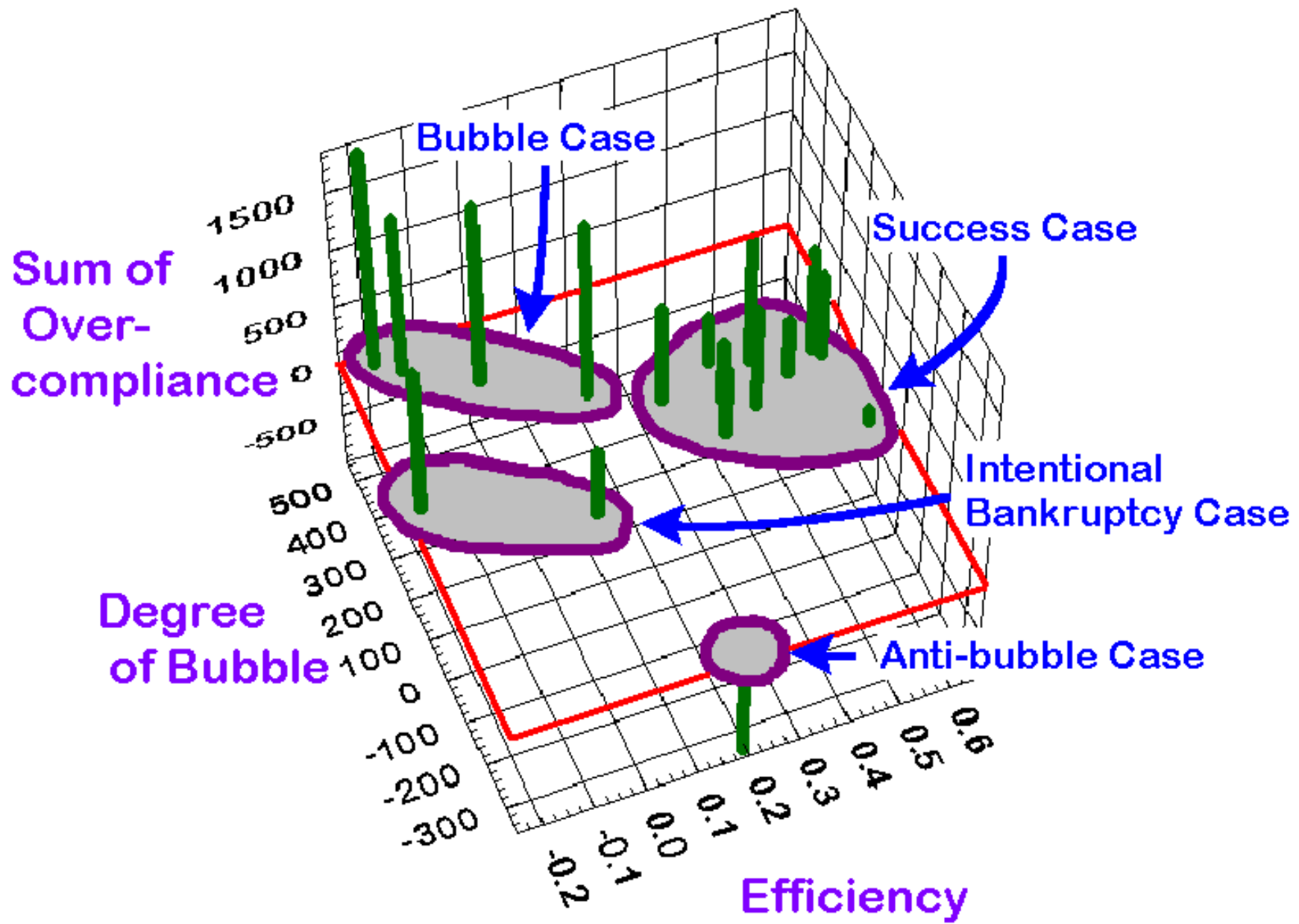
Buyer's Liability (Country-First) , Bilateral
Trading Information Closed, Second Session



Intentional Bankruptcy Case

Buyer's Liability (Kyoto-First), Bilateral Trading Information Closed, Second Session





7. Concluding Remarks

(a) Four Cases:

- (1) **Success Case**
 - (2) **Bubble Case**
 - (3) **Anti-Bubble Case**
 - (4) **Intentional Bankruptcy Case**
- } **Seller's**
- } **Country First**
- } **Kyoto First**

(b) **Country-First** is better than **Kyoto-First** (Incentives)

(c) Which is better between **Seller's** and **Country-First**?

- (1) Statistically, no difference (need more experiments!)
- (2) If we can design some mechanism to eliminate the failure case, it seems that **Seller's** is better than **Country-First** (?)