

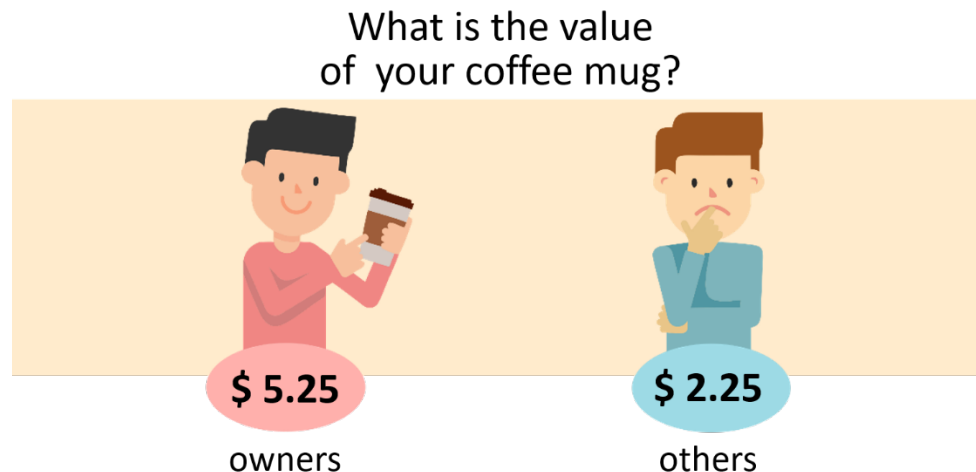
# A General Framework for the **Endowment Effect** in Combinatorial Markets

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## The **Endowment Effect**

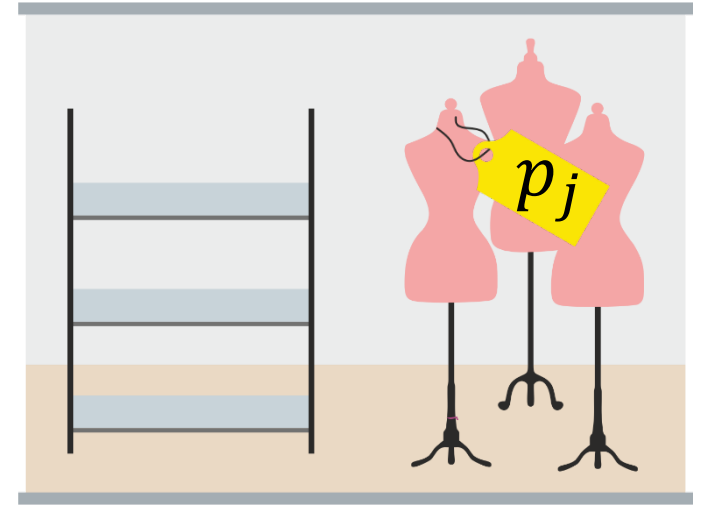
[Thaler 80, Knetsch 89, KahenmanKnetschThaler 90]:

**People tend to inflate the value of what they own**



# Walrasian Equilibrium (WE) in Combinatorial Markets

- $n$  buyers
- A set  $M$  of  $m$  items
- Every buyer has a **valuation function**:  $v_i: 2^M \rightarrow R^+$
- Utilities are quasi-linear
  - utility = value – price



## Walrasian Equilibrium (WE):

Allocation:  $S_1, S_2, \dots, S_n$

Item prices:  $p_1, p_2, \dots, p_m$

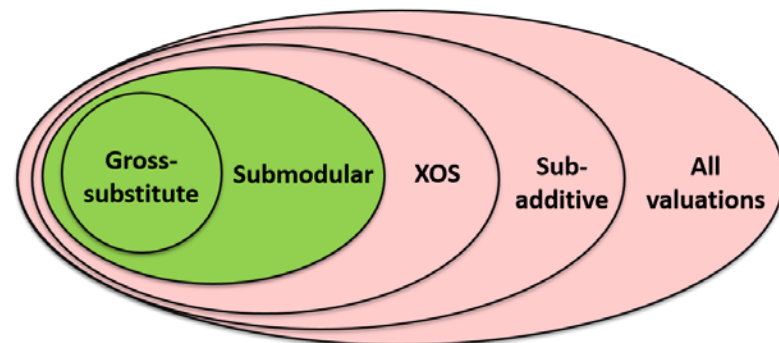
s.t.

1. Every buyer  $i$  **maximizes utility**
2. **All items are sold**



# WE (in)existence and Endowment Equilibrium

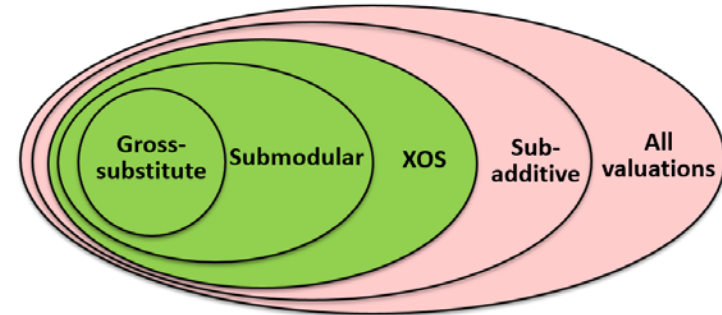
- **Theorem** [Gul Stacchetti 99, Kelso-Crawford 82]: WE exists only\* for gross-substitutes valuations
- Recent work [Babaioff Dobzinski Oren '18] harness the endowment effect for market stability
  - **Endowed valuations**: Being endowed bundle  $X$ , the value for bundle  $Y$ :
$$v^X(Y) = \alpha \cdot v(X \cap Y) + v(Y \setminus X | X \cap Y)$$
  - **Endowment Equilibrium** = **Walrasian equilibrium** with respect to **endowed valuations**
  - Endowment equilibrium exists for submodular valuations, but not for XOS valuations



# Our Contribution

1. We introduce a new **framework** that captures a wide range of endowment effects
  - effects are (partially) ranked from weak to strong

2. We present a new endowment effect that **guarantees** (for itself or any stronger effect) endowment equilibrium for **XOS valuations** (with  $\geq \frac{1}{2}$  the optimal welfare)



3. We show that **bundling** leads to **efficient** endowment equilibrium for **general valuations**