Chapter 4: Elasticity

Introductory Microeconomics

Jacob Hazen

McGill University

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jacobhazen1.github.io

Today

- 5.1 Government-Controlled Prices
- 5.2 Rent Controls: A Case Study of Price Ceilings
- 5.3 An Introduction to Market Efficiency

Learning goals

1. Describe how legislated price ceilings and price floors affect equilibrium price and quantity.
2. Compare the short-run and long-run effects of rent controls.
3. Describe the relationship between economic surplus and market efficiency.
4. Explain why price controls and output quotas tend to be inefficient.

Price ceilings (legal maximum price)

Definition: A price ceiling sets a legal upper bound on price.

Binding condition:

$$P_c < P^* \quad \Rightarrow \quad \text{binding (effective)}$$

Market effects when binding:

- Price cannot rise to P^*; transaction price at or below P_c.
- Quantity supplied falls and quantity demanded rises:

$$Q_s(P_c) < Q^* < Q_d(P_c)$$

- *Shortage* of size $Q_d(P_c) - Q_s(P_c)$.
- Non-price rationing emerges: queues, waitlists, first-come-first-served, discrimination, black markets.

Board sketch: Standard S-D with P_c below P^*; label shortage.

Price floors (legal minimum price)

Definition: A price floor sets a legal lower bound on price.

Binding condition:

$$P_f > P^* \quad \Rightarrow \quad \text{binding (effective)}$$

Market effects when binding:

- Price cannot fall to P^*; transaction price at or above P_f.
- Quantity demanded falls and quantity supplied rises:

$$Q_d(P_f) < Q^* < Q_s(P_f)$$

- *Surplus* of size $Q_s(P_f) - Q_d(P_f)$.
- Disposal/stockpiles or government purchase; potential waste/misalallocation.

Board sketch: Standard S-D with P_f above P^*; label surplus.

Binding vs. non-binding; incidence and elasticities

- **Non-binding:** If $P_c \geq P^*$ or $P_f \leq P^*$, no effect on P, Q.
- **Who is constrained?** For ceilings, sellers cannot raise price; for floors, buyers cannot negotiate down.
- **Elasticities matter:** The size of shortages/surpluses depends on the price responsiveness of S and D.
- **Quality margins:** When price cannot adjust, quality and non-price attributes adjust (maintenance, service, perks).

Rent control basics

Policy: A price ceiling on rent P_{rent}.

If binding:

$$P_{\text{rent}} < P^*_{\text{rent}} \quad \Rightarrow \quad Q_d > Q_s \text{ (housing shortage)}$$

Rationing: Waitlists, key money, discrimination, informal side payments. **Quality:** Landlords reduce maintenance/amenities when price is constrained.

Short run vs. long run under rent control

Short run (SR):

- Housing supply is relatively inelastic (fixed stock).
- Shortage exists but is limited by low supply responsiveness.
- Small reductions in new listings/maintenance.

Long run (LR):

- Supply becomes more elastic: construction discouraged, conversions to condos/other uses, exit from rental market.
- Demand more elastic: more households want controlled units at low rent.
- *Larger shortage*, increased misallocation (units not going to highest-valuation renters).
- Quality deterioration accumulates; under-maintenance and slower upgrading.

Board sketch: Compare SR inelastic S vs. LR more elastic S; show larger gap $Q_d - Q_s$ in LR.

Distributional notes (who gains/loses?)

- **Winners:** Incumbent tenants who secure units at controlled rents.
- **Losers:** Prospective tenants rationed out; some landlords; tenants facing reduced quality/search costs.
- **Misallocation:** Units may be occupied by lower-valuation users while higher-valuation users are rationed out.

Efficiency preview: These features generate deadweight loss (foregone mutually beneficial trades).

Consumer, producer, and total surplus

Consumer Surplus (CS): Willingness to pay minus price, summed over buyers.
Producer Surplus (PS): Price minus marginal cost (or minimum acceptable price), summed over sellers.

Total Surplus (TS):

$$TS = CS + PS$$

Key result in competitive markets:

$$(P^*, Q^*) \text{ maximizes } TS \quad \text{(no externalities, no market power)}$$

Board sketch: CS and PS areas under D and above S up to Q^*.

Why price controls reduce efficiency

When a binding ceiling/floor is imposed:

- Quantity traded falls below the efficient level Q^*.
- Mutually beneficial trades between Q and Q^* are *not realized*.
- **Deadweight loss (DWL):** Lost TS due to underproduction or overproduction.

$$\text{DWL} = TS^* - TS^{\text{policy}}$$

Board sketch: Triangle between S and D over the range of foregone trades.

Output quotas and inefficiency

Quota (quantity control): Legal limit $Q_{\max}$ on output or transactions.

If binding:

$$Q_{\max} < Q^* \quad \Rightarrow \quad \text{underproduction and DWL}$$

Quota wedge and license value:

- Creates a price gap (wedge) between buyers and sellers:

$$\text{Quota rent} = P_{\text{buyers}} - P_{\text{sellers}}$$

- Value accrues to holders of production/transaction licenses.

Board sketch: Vertical quota line at $Q_{\max}$; wedge between D and S prices; DWL triangle.

Checklist: linking back to learning goals

1. **Ceilings/floors** shift the transaction price away from P^* and reduce traded quantity when binding.
2. **Rent control SR vs. LR:** Shortage grows over time as elasticities rise; quality and allocation issues intensify.
3. **Efficiency:** $TS = CS + PS$ maximized at Q^*; controls move the market away from efficiency.
4. **Inefficiency from controls/quotas:** They create DWL by preventing mutually beneficial trades.

Quick practice (no graphs required)

- A city sets P_c for rent at 10% below P^*. List at least three non-price rationing mechanisms that may arise.
- A minimum wage P_f exceeds P^* in a specific labour market. Who is made better off? Worse off? Why might total hours of employment fall?
- With linear S and D, explain how you would compute DWL from a binding quota $Q_{\max}$ using areas:

$$\text{DWL} = \tfrac{1}{2} \times (\text{wedge height}) \times (\text{reduction in } Q).$$