

STUDY GUIDE

Principles of Microeconomics

ECON-001-20 · Summer 2017

A self-study companion for midterm and final review.

Not the textbook. Not an official exam.

This is a study guide. It walks through one summer course in microeconomics, topic by topic, with explanations, worked examples, practice prompts, and answer keys kept behind STOP pages.

Course: Econ-001-20, Principles of Microeconomics, Georgetown University, Summer 2017. (*Example packet — historical dates; not a later offering.*)

Books used:

- Syllabus (S-SYL) — the course syllabus. It sets scope, schedule, and assessment; it is the authority on what is in and out.
- Primary content (S-PR) — Pindyck & Rubinfeld, *Microeconomics*, 9th Global Edition. This is the on-disk stand-in for the syllabus-named 8th edition; the edition gap is disclosed throughout and nothing is cited as “the 8th edition.”
- Supplemental only (S-MG) — Mankiw, *Principles of Microeconomics*. Used only to fill intuition gaps where the primary text is thin. Every use is labeled supplemental; it never sets scope or exam coverage.

Not the textbook. Not an official exam. Not a posted mock, and not an instructor answer key.

Start here

What this is

This guide is a working companion, not a replacement for the assigned textbook. It reorganizes a fast five-week summer course into the order you will actually study it: concepts first, then a worked example you can copy, then practice you write yourself, then a key to check against.

Everything that states a course fact is grounded in the syllabus or the primary textbook. Everything that is a constructed example, a practice prompt, or an answer key is original instructional material — built from the verified content, never pulled from an exam you were never shown.

The three sources

Three documents support this guide, and they play different roles. The syllabus decides what belongs in the course and what does not. The primary textbook (Pindyck & Rubinfeld) supplies the definitions, models, graphs, and formulas for the chapters the syllabus names. The Mankiw book is supplemental only — it is used here and there to explain something more intuitively, never to add coverage the syllabus did not authorize. When the two books differ on treatment, the primary textbook wins; when either differs from the syllabus, the syllabus wins.

One edition note, stated plainly so it never surprises you later: the syllabus names the 8th edition of Pindyck & Rubinfeld, but the copy used to build this guide is the 9th Global Edition. The chapter-by-chapter treatment is close enough to be a reliable stand-in, and where the two might diverge it is flagged rather than guessed.

How to use this guide

Work in a quiet order, and let the structure do the pacing:

1. Read a topic. Each core idea is a few short paragraphs — what it is, why it works, and the nearby mistake it is easy to fall into.
2. Try the worked example. The examples use made-up numbers and a method you can copy. Re-do the steps yourself, then compare.
3. Write your own answers. Practice prompts appear unanswered. Write before you peek.
4. Check the key. Keys sit behind STOP pages so the answers are not in your eye while you work. If you miss a step, the key points back to the exact concept and confusion rule to revisit.

There is no required pace and no lecture here. You may study out of order if a topic is already solid, and you may skip the practice for a topic you have truly mastered — the keys are there to verify, not to shame.

Scope and assessment timing

This guide follows the syllabus week by week.

Week	Dates (2017)	Chapters	Depth
1	Jul 10–13	Ch. 1 Preliminaries · Ch. 2 Supply & Demand · Ch. 3 Consumer Behavior	Full
2	Jul 17–20	Ch. 4 Individual & Market Demand · Ch. 5 Uncertainty & Consumer Behavior	Full
3	Jul 24–27	Ch. 6 Production · Ch. 7 Cost · Ch. 8 Competitive Supply · Ch. 9 Competitive Markets	Full
4	Jul 31–Aug 3	Ch. 10 Monopoly & Monopsony · Ch. 11 Pricing with Market Power · Ch. 12 Monopolistic Competition & Oligopoly	Full
5	Aug 7–10	Ch. 13 Game Theory · Ch. 14 Factor Markets · Ch. 15 Time & Capital · Ch. 17 Asymmetric Information · Ch. 18 Externalities & Public Goods	Overview only

In and out, in plain language:

- Weeks 1–4 are studied in full depth — these are the core models of consumers, firms, and markets.
- Week 5 is overview only. The syllabus covers just the main topics; the chapters are presented as compact reference cards, not full workbook units.
- Chapter 16 (General Equilibrium) is not on the syllabus, and Chapter 19 (Behavioral Economics) appears only in the 9th-edition file. Neither is studied here.
- Week 4 is not on Midterm 2. Midterm 2 falls on Jul 31 — the *first* day of Week 4 — so the Week 4 chapters are tested on the final, not on Midterm 2.
- Midterm 1 vs. Chapter 5 is unresolved. Midterm 1 is Jul 20, the last day of Week 2, the week Chapter 5 is scheduled. Whether Chapter 5 was fully covered or tested that day is unknown. This guide prepares it fully, but treats it as uncertain rather than inventing what was cut.

Assessment shape, for study priority only: quizzes 20/100, first midterm 25/100, second midterm 25/100, final 30/100. Quizzes are short multiple-choice with open notes; midterms and the final are open questions, closed book, mixing problems with commentary on current economic issues.

Cheat sheets

Four dense references carry the load-bearing models of the course. Use them to look up a formula quickly; they are not a substitute for the topic chapters.

Cheat Sheet 1 — Consumer theory & elasticity (Weeks 1–2 · Ch. 1–5)

Elasticity — one formula shape, four interpretations.

Elasticity	Formula	Sign reading
Price elasticity of demand (point)	$E_p = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$	Negative. $ E_p > 1$ elastic · = 1 unit · < 1 inelastic
Price elasticity of demand (arc)	$E_p = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$	Uses midpoints over a range
Income elasticity	$E_I = \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q}$	Positive = normal · negative = inferior
Cross-price elasticity	$E_{xy} = \frac{\Delta Q_x}{\Delta P_y} \cdot \frac{P_y}{Q_x}$	Positive = substitutes · negative = complements
Price elasticity of supply	$E_s = \frac{\Delta Q_s}{\Delta P} \cdot \frac{P}{Q_s}$	Usually positive

Consumer choice.

- Budget line: $P_x X + P_y Y = I$, slope $-P_x/P_y$.
- Optimum (tangency): $MRS_{xy} = \frac{MU_x}{MU_y} = \frac{P_x}{P_y}$, equivalently $\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$.
- Real price: $\text{Real}_t = \text{Nominal}_t \times \frac{\text{CPI}_{\text{base}}}{\text{CPI}_t}$.

Income and substitution effects (price of X falls).

Good	Substitution effect	Income effect	Net	Demand curve
Normal	More X	More X (reinforces)	Both positive	Downward
Inferior	More X	Less X (opposes)	Substitution usually wins	Downward
Giffen	More X	Less X (overwhelms)	Income wins	Upward

Uncertainty.

- Expected value: $E(X) = \text{Pr}_1 X_1 + \text{Pr}_2 X_2 + \dots$
- Expected utility: $E[U] = \text{Pr}_1 U(W_1) + \text{Pr}_2 U(W_2)$
- Risk aversion $\Leftrightarrow U(W)$ concave $\Leftrightarrow E[U(W)] < U(E[W])$.
- Certainty equivalent W_{CE} solves $U(W_{CE}) = E[U]$; risk premium $RP = E(W) - W_{CE}$.

Cheat Sheet 2 — Production, cost & competitive markets (Week 3 · Ch. 6–9)

Production.

- $q = F(K, L)$; $MP_L = \frac{\Delta q}{\Delta L}$; $AP_L = \frac{q}{L}$.
- $MRTS = \frac{MP_L}{MP_K}$ (slope of the isoquant).
- Diminishing marginal returns (short run, one input fixed) $\neq$ returns to scale (long run, all inputs scaled).

Cost.

- $TC = FC + VC$; $ATC = AFC + AVC$.
- $MC = \frac{\Delta TC}{\Delta Q} = \frac{\Delta VC}{\Delta Q} = \frac{w}{MP_L}$.
- MC crosses AVC and ATC at their minimum points; the gap $ATC - AVC = AFC$ shrinks to zero.

- Cost minimization: $\frac{MP_L}{w} = \frac{MP_K}{r}$, i.e. $MRTS = \frac{w}{r}$.

Competitive firm.

- Profit-maximizing rule: $P = MR = MC$.
- Short-run supply = MC above min AVC ; shut down if $P < AVC$.
- Long run: entry/exit drives $P = \min LRAC$ (zero economic profit); exit if $P < ATC$.
- Profit: $\pi = (P - ATC) \cdot q$.

Welfare and intervention.

- Consumer surplus = area between demand and price; producer surplus = area between price and supply.
- Total surplus = $CS + PS$; deadweight loss = surplus destroyed by producing the wrong quantity.
- Tax: $P_b - P_s = t$; buyer share = $\frac{E_s}{E_s - E_d}$; $DWL = \frac{1}{2}t(Q_0 - Q_1)$.

Cheat Sheet 3 — Market structure & pricing power (Week 4 · Ch. 10–12)

Monopoly.

- Rule: $MR = MC$; with linear demand $P = a - bQ$, $MR = a - 2bQ$.
- Markup: $MR = P\left(1 + \frac{1}{E_d}\right)$.
- Lerner index: $L = \frac{P - MC}{P} = -\frac{1}{E_d}$.
- A monopolist has no supply curve; it restricts output below the competitive level, creating deadweight loss.

Price discrimination.

Degree	Mechanism	Outcome
First	Charge each buyer their full willingness to pay	All surplus to the firm; output reaches the competitive level
Second	Block / tier pricing	Buyers self-select by volume
Third	Segment by observable group	$MR_1 = MR_2 = MC$; higher price to the less elastic group

Oligopoly and monopolistic competition.

- Cournot (quantities): each firm sets $MR_i(q_j) = MC$; equilibrium where reaction curves cross.
- Bertrand (prices, homogeneous good): $P = MC$ — the competitive result even with two firms.
- Stackelberg: the leader commits first, substituting the follower's reaction function.
- Monopolistic competition long run: $P = ATC$ but $P > MC$ (tangency, zero economic profit with residual market power).

Cheat Sheet 4 — Week 5 overview cards (Ch. 13, 14, 15, 17, 18)

Game theory (Ch. 13).

- Dominant strategy: best regardless of the rival's move.
- Nash equilibrium: mutual best responses — no player wants to change unilaterally.
- Prisoner's dilemma: individually rational choices produce an outcome worse for both than cooperation.

Factor markets (Ch. 14).

- $MRP_L = MP_L \times MR$; in a competitive output market $MRP_L = MP_L \times P$.
- Hire until $MRP_L = w$.

Time and capital (Ch. 15).

- Present value: $PV = \sum_{t=1}^T \frac{CF_t}{(1+R)^t}$.
- Net present value: $NPV = -C_0 + \sum \frac{\pi_t}{(1+R)^t}$; accept if $NPV > 0$.

Asymmetric information (Ch. 17).

- Adverse selection (hidden *type*, before the contract) vs. moral hazard (hidden *action*, after the contract).
- Remedies: signaling and screening.

Externalities and public goods (Ch. 18).

- Negative externality: $MSC = MPC + MEC$; Pigouvian tax $t^* = MEC$.
- Coase theorem: with clear property rights and low bargaining costs, parties reach the efficient outcome themselves.
- Goods taxonomy: private (rival + excludable), public (non-rival + non-excludable), common (rival + non-excludable), club (non-rival + excludable).
- Free-rider problem; Samuelson condition for public goods: $\sum MRS = MRT$.

Visual reviews

Each figure is drawn once for you. The real check is whether you can reproduce its shape and labels from memory. Cover the image, sketch the axes and curves, then compare. Every figure has a purpose, a caption, and a prose version for readers who prefer words to pictures.

V-01 — Real vs. nominal price adjustment

Redraw from memory: sketch a three-step flow — *nominal price* → multiplied by $\times (CPI_{base}/CPI_t)$ → *real price* — and write the deflator ratio in words.

V-01: Nominal-to-Real Price Transformation via CPI Deflator

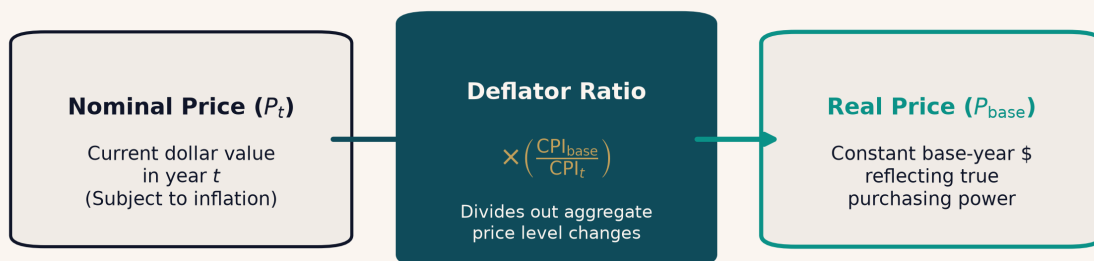


Figure V-01. Nominal-to-Real Price Transformation. The deflating operation divides out aggregate price-index changes to isolate changes in relative scarcity.

Purpose: separate nominal dollar amounts from constant-dollar purchasing power, so a nominal price rise is not mistaken for a real rise.

Prose alternative: A nominal price is the raw dollar amount in that year's currency. To get the real price in constant base-year dollars, multiply the nominal price by the ratio of the base-year CPI to the current-year CPI. If the nominal price grows slower than the CPI, the real price falls even though the dollar tag is higher.

V-02 — Market equilibrium, surplus, shortage, and a demand shift

Redraw from memory: draw upward supply and downward demand crossing at (P^*, Q^*) , label the surplus zone above and the shortage zone below, then shift demand right and show the new, higher equilibrium.

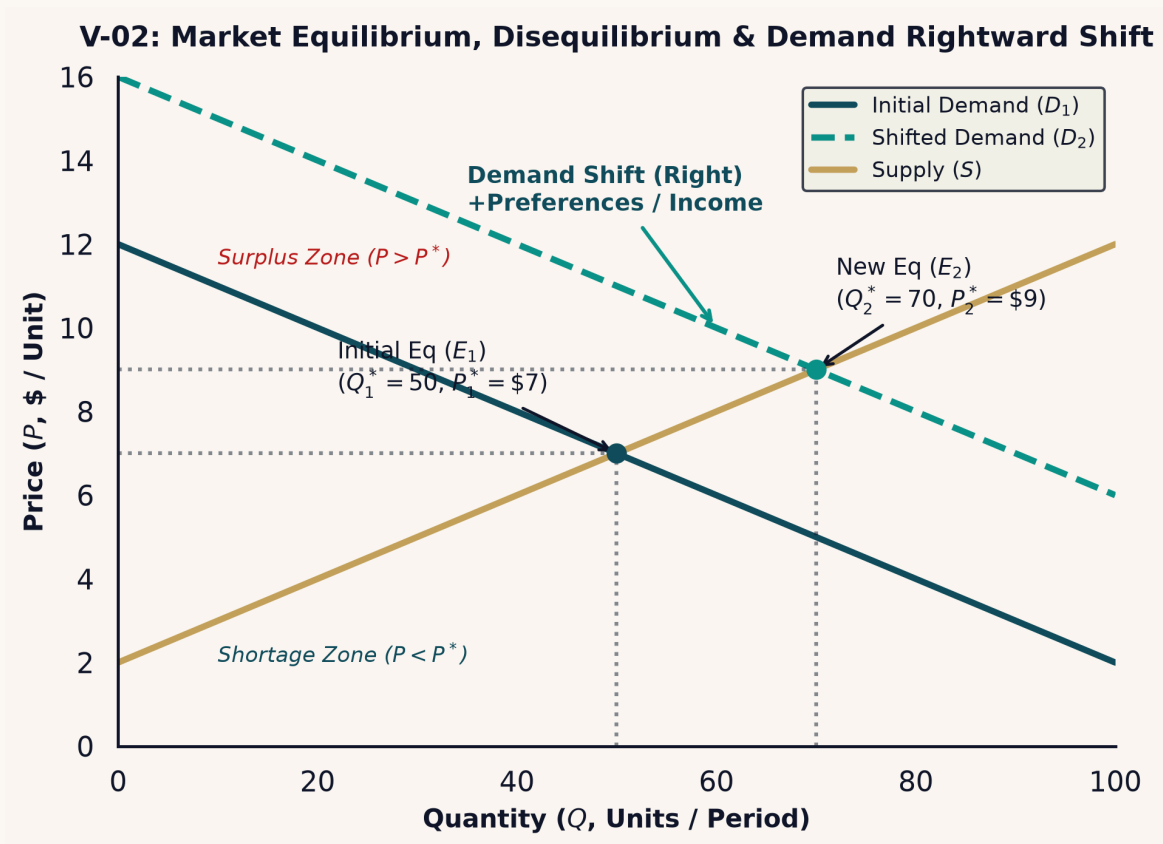


Figure V-02. Market Equilibrium and Rightward Demand Shift. At P_1^* , quantity supplied equals quantity demanded. An exogenous rise in buyer preference shifts demand to D_2 , creating a temporary shortage at the old price and bidding price up to P_2^* .

Purpose: ground how price forms at the intersection of supply and demand, and how an exogenous demand change moves the market to a new equilibrium.

Prose alternative: Supply slopes up, demand slopes down, and their intersection sets equilibrium price P_1^* and quantity Q_1^* . A price above P_1^* leaves $Q_S > Q_D$ — a surplus; below it, a shortage. When demand shifts right, a shortage appears at the old price, pressure pushes price up, and the market settles at a higher price P_2^* and quantity Q_2^* .

V-03 — Elasticity and revenue along a linear demand curve

Redraw from memory: draw a straight demand line and mark the midpoint, then draw the total-revenue hill beneath it and label which region is elastic, unit-elastic, and inelastic.

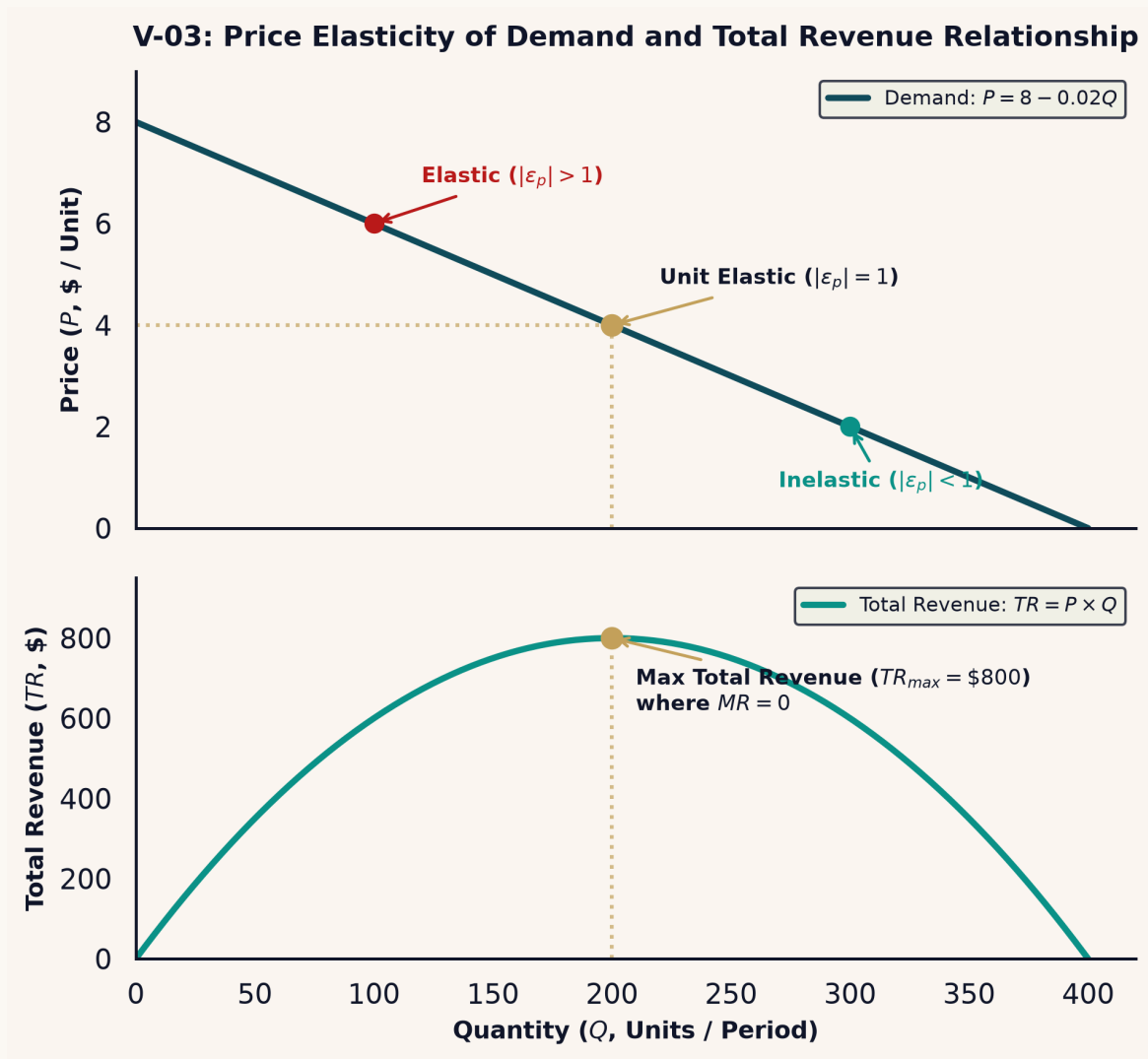


Figure V-03. Price Elasticity of Demand and Total Revenue along a Linear Demand Curve. Elasticity falls from infinity at the price intercept to zero at the quantity intercept; total revenue peaks exactly at the unit-elastic midpoint.

Purpose: show that a linear demand curve does *not* have constant elasticity, and connect elasticity to what happens to total revenue when price changes.

Prose alternative: Above the midpoint of a linear demand curve, demand is elastic ($|\epsilon_p| > 1$), so a price cut raises total revenue. At the midpoint, elasticity is unit and total revenue is maximized. Below the midpoint, demand is inelastic ($|\epsilon_p| < 1$), so further price cuts lower total revenue — the percentage quantity gain is smaller than the percentage price drop.

V-04 — Consumer optimum: budget line and indifference map

Redraw from memory: draw a budget line with intercepts I/P_y and I/P_x , then an indifference map and mark the tangency point where $MRS = P_x/P_y$.

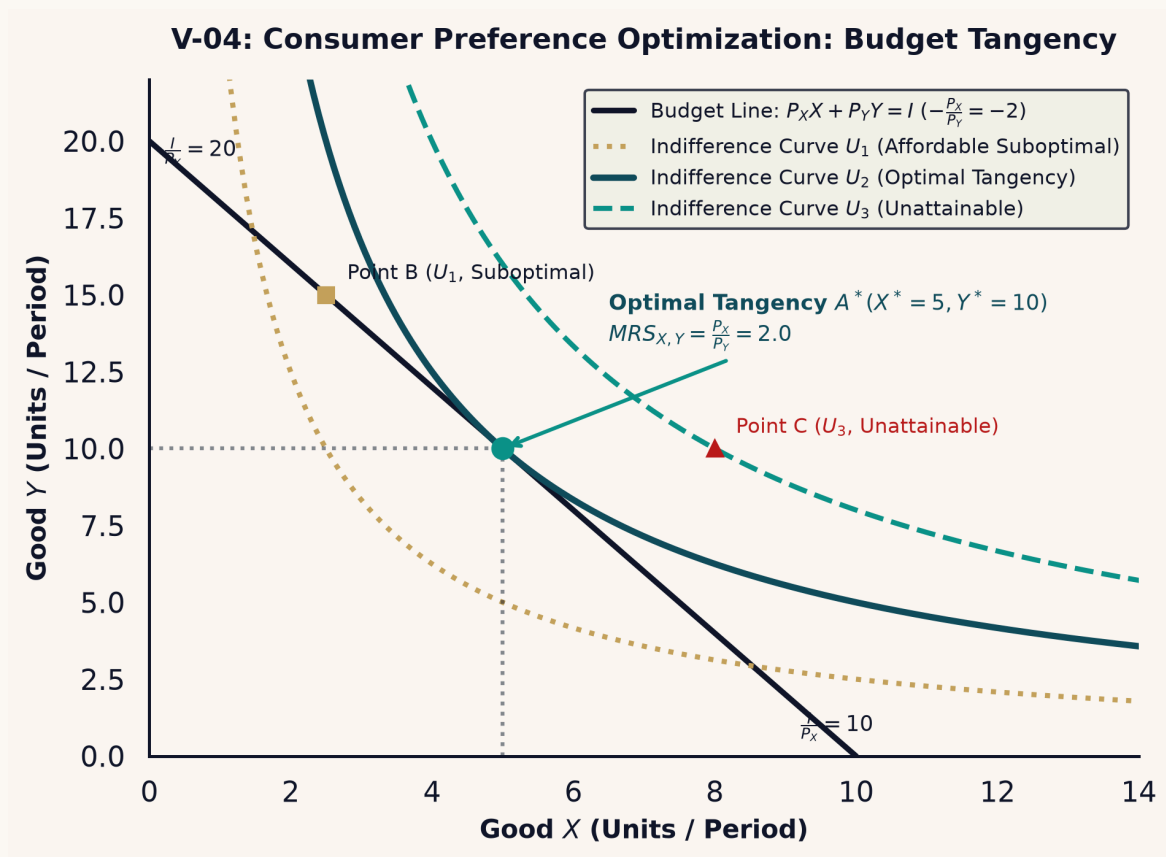


Figure V-04. Optimal Consumer Choice under Budget Constraints. The optimal bundle A^* sits on the highest reachable indifference curve tangent to the budget line, equating the subjective trade-off (MRS) to the market trade-off (P_x/P_y).

Purpose: show how a consumer maximizes satisfaction within a budget by finding the tangency between the budget line and an indifference curve.

Prose alternative: The budget line marks affordable bundles, with intercepts I/P_y and I/P_x and slope $-P_x/P_y$. Indifference curves map bundles of equal utility. The consumer reaches the highest curve that touches the budget line; at that tangency, $MRS_{x,y} = MU_x/MU_y$ exactly equals the price ratio P_x/P_y .

V-05 — Income and substitution effects (normal good)

Redraw from memory: show a budget line rotating outward as P_x falls, and label the three bundles — initial A , compensated B , final C — then bracket substitution ($A \rightarrow B$) and income ($B \rightarrow C$).

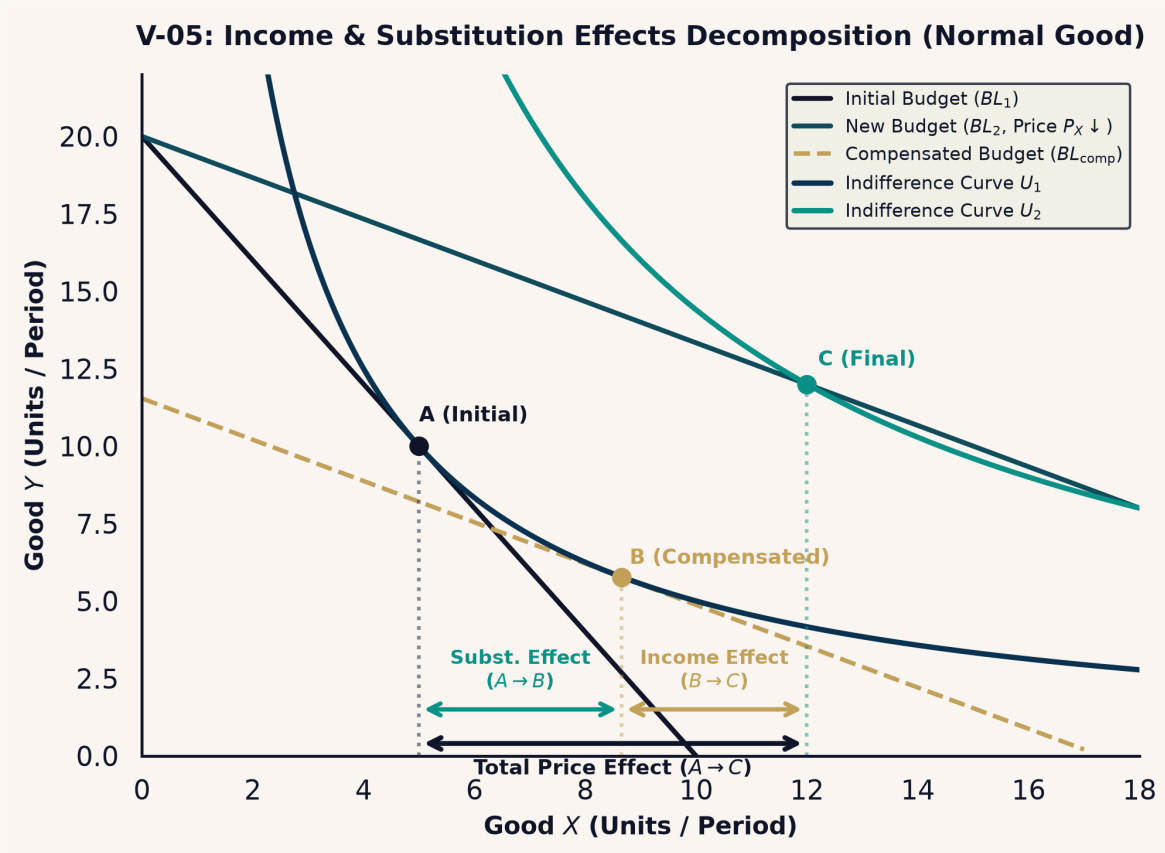


Figure V-05. Slutsky/Hicksian Decomposition for a Price Decrease in a Normal Good. The substitution effect ($A \rightarrow B$) isolates the relative-price change; the income effect ($B \rightarrow C$) captures the purchasing-power gain; both reinforce higher consumption of X .

Purpose: split a price change into the pure substitution effect and the income effect, the foundation for understanding normal, inferior, and Giffen goods.

Prose alternative: When P_x falls, consumption rises from X_A to X_C . The substitution effect moves the consumer along the original indifference curve from A to B as X becomes relatively cheaper. The income effect then moves from B to C because the lower price frees up real purchasing power. For a normal good the two effects reinforce.

V-06 — Expected utility and risk aversion

Redraw from memory: draw a concave utility-of-wealth curve, a chord between two wealth outcomes, and mark expected wealth, the certainty equivalent, and the risk premium.