

ECON 101: Principles of Microeconomics (Fall 2013)

Review Sheet (also known as “*The Giant Flash Card*”) for Topics Covered in Midterm 2¹

DO NOT BRING THIS REVIEW SHEET TO THE EXAM!

The following topics have been covered in lectures and discussion sections after Midterm 1 and will be asked in Midterm 2. You are expected to know these and be able to solve the problems WITH ACCURACY and SPEED. Furthermore, you are expected to know the material covered for Midterm 1 (e.g. percentage change, equation of a line, demand curve, solving for equilibrium) as we will frequently use to solve the problems.

Again, there will be 30 questions in 75 minutes, so you should average out 2.5 minutes per question. Even if some questions might take you less than 30 seconds, others might take as long as 5 minutes, spare your time accordingly. *Rule of thumb: if the additional (marginal) benefit is greater than additional (marginal) cost, do it! Otherwise, don't! (In fact, this is the main idea of every economic concepts!) You are maximizing the probability of getting the questions right, subject to the time constraint – if the additional time cost needed to get them right is higher the additional benefit, then you should do other questions!*

Topics studied so far are inter-related, you should expect something to cross-over with each other, e.g. production and cost will show up in perfect competition problem.

Demand and Supply – The International Trade and Intervention

- With international trade, what is the effect to the domestic demand/supply? What is the world price? What happen if world price is lower/higher than autarky equilibrium? What is the new supply or new demand curve? What is the new equilibrium? How to find the amount consumed? How to find the amount produced domestically?
- With import tariff, what is the new demand/supply curve? How to solve for the new equilibrium? How to find the amount consumed? How to find the amount produced domestically? How to find government revenue? What is the deadweight loss? What is prohibitive import tariff?
- With import quota, what is the new demand/supply curve? How to solve for the new equilibrium? How to find the amount consumed? How to find the amount produced domestically? How to find government revenue? What is the deadweight loss? Is the import quota binding?

Real and Nominal Variables

- Some Formulae:

$$\begin{aligned}\text{Real Price} &= \frac{\text{Nominal Price}}{\text{CPI}} \times \text{Scale Factor} \\ \text{CPI} &= \frac{\text{Market Basket Price of Year } t}{\text{Market Basket Price of Base Year}} \times \text{Scale Factor}\end{aligned}$$

- What is the market basket? How to find the market basket? What is the base year? What is CPI? How to calculate CPI? (Be careful with scale factor!) What is inflation? (Inflation is simply percentage change in CPI.) How to change the base year and re-calculate CPI and inflation? (By now you should know some trick about inflation when you change the base year.) More importantly, how to back out the information from the given data? (As you know, we won't give you all the information needed!)
- What is nominal price? What is real price? What is the percentage change in nominal price? What is the percentage change in real price? What would happen to nominal price and real price when the base year is changed? How can you take the price and go back and forth in time?

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Elasticities and Total Revenue

- What is regular percentage change? What is arc percentage change?
- In general, what is elasticity? It is simply the ratio of percentage change of the cause (x) to percentage change of the effect (y), i.e. $\varepsilon_x^y = \frac{\% \Delta y}{\% \Delta x}$. So whatever you have in the world as cause and effect, you can measure in terms of elasticity. Hence, think about the price of a good causes the change in quantity demanded for that good (own-price elasticity of demand), to the quantity demanded for the other good (cross-price elasticity of demand), or to the quantity supplied for that good (price elasticity of supply). How about income causes change to quantity demanded (income elasticity of demand)?
- The three formulation of elasticities: slope form, point elasticity, arc (midpoint) elasticity. Take the own-price elasticity of demand, clearly price of good x (p) causes the change in quantity demanded of good x (q), so we have the following formulation:

$$\text{(Slope form)} \quad \varepsilon_p^d = \frac{\% \Delta q}{\% \Delta p} = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}} = \frac{\Delta q}{\Delta p} \cdot \frac{p}{q} = \frac{1}{\text{slope of demand curve}} \cdot \frac{p}{q}$$

$$\text{(Regular percentage elasticity)} \quad \varepsilon_p^d = \frac{\% \Delta q}{\% \Delta p} = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}} = \frac{\frac{q_2 - q_1}{q_1}}{\frac{p_2 - p_1}{p_1}}$$

$$\text{(Arc percentage elasticity)} \quad \varepsilon_p^d = \frac{\% \Delta q}{\% \Delta p} = \frac{\frac{\Delta q}{q}}{\frac{\Delta p}{p}} = \frac{\frac{q_2 - q_1}{\left(\frac{q_1 + q_2}{2}\right)}}{\frac{p_2 - p_1}{\left(\frac{p_1 + p_2}{2}\right)}}$$

Note that point elasticity and midpoint elasticity are different by the base you use as the divisor (i.e. the base) – point method uses initial condition, arc method uses the average. The slope form means that, what is the elasticity instantaneously at (p, q) , while the other two means the change from situation 1 (p_1, q_1) to situation 2 (p_2, q_2) .

- In calculating cross-price and income elasticity of demand, we will use only regular percentage change in this class.
- If you have demand curve/demand function, supply curve/supply function, you should be able to find and calculate the elasticities. Similarly, you should also be able to back out the demand curve/demand function, supply curve/supply function!
- Hence, you can derive the formula for all elasticities we have studied.
- Which elasticity you can take the absolute value (i.e. neglect the negative sign)? Why and why not? What is the meaning of each elasticity? Why is it normal good, inferior good, substitute and complement? Can you interpret the elasticities?
- What is elasticity on the demand curve? Is it always the same throughout the demand curve? How is it changing? What is the point where revenue is maximized? The midpoint of demand curve is not the same as midpoint elasticity, but the elasticity of the midpoint of demand curve.

Excise Tax and the Relationship to Elasticities

- Which side of the market that the tax has been imposed? What is the effect of excise tax on demand or supply curve? How does each curve shift? How to find the quantity traded with tax, the price that consumer pays and producer receives? What is consumer surplus and producer surplus after the tax? What are the consumer tax incidence and producer tax incidence? What is the government revenue? What is the deadweight loss?
- How are elasticities represented on the slope of demand and supply curves? What is the effect of elasticities of both consumer and producer on taxation? Which side of the market bears more of the burden? What is the fraction of burden born on each side of the market – slope of demand curve

shortcut? What about the special cases of perfectly inelastic and perfectly elastic of demand and supply curve? (By now you should know why I always insist on whether the curves are shifted up-down or right-left!)

Consumer Theory

- If you draw graphs in these type of problems, always be precise and label everything.
- What is budget line? What are the components of budget line? What is the meaning of the budget line, the meaning of endpoints of budget line? When price changes, what happen to the budget line? When income changes, what happen to the budget line? What is tax on consumption good considered as on the budget line? What is income tax considered as on the budget line?
- What is utility? What is marginal utility? What is indifference curve? What is the meaning of the slope of indifference curve? What is marginal rate of substitution and the meaning? Why is it convex to the origin (bending towards the origin)? What about the special cases of the indifference curves (perfect complements, perfect substitutes, neuters) – how do they look like?
- Consumer utility maximization problem (UMP) – the optimality (solution of consumer) consists of budget line and indifference curve. What is the optimal condition for consumer choosing the consumption bundle? $\left(\frac{MU_x}{P_x} = \frac{MU_y}{P_y}\right)$ What does it mean? (Last dollar spent on good x gives the same marginal utility from good x as the last dollar spend on good y gives the same marginal utility from good y . Clearly, if the last dollar you have gives you higher additional utility from good x than good y , you should spend it on good x .) How to find/calculate the optimal consumption bundle? What happen to the optimal consumption bundle if price changes or income changes? Can you derive the demand curve of a good? Can you analyze the substitution of a good when price changes?
- How to find the optimal consumption bundle when the preference is such that two goods are perfect complements or perfect substitutes? Clearly you cannot use the formula $\left(\frac{MU_x}{P_x} = \frac{MU_y}{P_y}\right)$ here! How to characterize the optimal consumption bundle? Is it always one-to-one unit of each good in the case of perfect complements? Does the consumer always consume only one good in case of perfect substitutes?
- Application: how to analyze the effect of tax on consumption good and tax on income, using the budget lines and indifference curves?
- How to decompose the effect of price change? What are substitution effect and income effect? How to draw the hypothetical budget line? What is the meaning of hypothetical budget line? Can we say that a good is normal or inferior? How do substitution and income effects look like when a good is normal or inferior? What about the special cases of indifference curves?

Production and Cost

- Make sure you don't get tangled with the spaghetti of cost curves! Total cost (TC), total fixed cost (TFC), total variable cost (TVC), average total cost (ATC), average fixed cost (AFC), average variable cost (AVC), marginal cost (MC) - how to find each one? Where should the curves of MC goes through the ATC and AVC? What is the gap between AFC and ATC, the gap between AVC and ATC? How do they look like?
- What is production function? (How much you put in as input gives how many output?) What is the marginal product? What is average product? Why does the production function take some particular shape?
- If you don't have functional form, you have the table of costs, how to fill in? How about the production? Variable cost depends on quantity, fixed cost does not.
- Can you relate to the amount produced and cost of production? (Can you relate production function to/from cost function?)

- What are short run and long run? How are they defined? Do you have fixed cost in the long run? Make sure you distinguish inefficiencies between short run (law of diminishing marginal return) and long run (return to scale). What are they? How are they defined?

Perfect Competition

- What is perfectly competitive market? What are the characteristics of this market type? Why do you have perfectly elastic demand (thus, $p = MR$) for product of a firm? What does it have to do with market demand and market supply? Should firm still produce even if it makes zero economic profit or negative profit?
- Short run - The spaghetti of MC, AVC and ATC shows up here. Where is the optimal production (profit maximization) of a firm in short run? How much should it produce? What is the revenue, cost and profit? How many firms in the short run equilibrium?
- Long run - The spaghetti of MC and AC shows up here. Where is the optimal production (profit maximization) of a firm in long run? How much should it produce? What is the revenue, cost and profit? How many firms in the long run equilibrium?
- What happen when there is entry/exit to the market? What happen when there are outside shifts of demand and supply curves? What is the break-even price? What is the shut-down price? What is the exit price?
- Short run and long run - Where is the supply curve in the short run and in the long run? What is the difference between shutdown and exit? What is the criterion that a firm uses to determine whether it wants to shutdown or exit and why?

Monopoly

- What is the demand curve facing the firm? Why is it different from the case firms in perfectly competitive market? What is marginal revenue? How to find marginal revenue?
- What is the profit maximizing rule for a monopolist? What does it mean? At such quantity, what is the cost to monopolist? What is the price charged to consumers? What is the total revenue? What is the profit? Should monopolist produce in the short-run or shutdown? Should monopolist exit in the long-run? Why? (Be sure you don't get tangled in the spaghetti of curves!)
- Why does monopolist not exist in the inelastic portion of demand curve?
- What is the consumer surplus? What is producer surplus? (This is clearly different from the profit! How and why?) What is the deadweight loss?
- Why are there deadweight losses? (Monopolist, in the effort to maximize profit, do what?) What is allocative efficiency? Why there is none of the efficiency? How to restore efficiencies? What is the social optimum? How to achieve such social optimum? Is it possible to sustain social optimum?

☺ *Good Luck for Your Midterm 2 Exam!* ☺