

Microeconomics

1. Let $X(p)$ be the demand function for goods X where p is its price. Denote the derivative of $X(p)$ with respect to p be $X'(p)$. A monopoly producer is facing this demand function.
 - 1-1. Define the price elasticity of demand for goods X at price p .
 - 1-2. If goods X are sold at price p , what is the marginal revenue of a monopoly producer?
 - 1-3. Suppose $X(p)=5-p$. What is the price elasticity of goods X when price $p=3$?
 - 1-4. What is the marginal revenue of goods X when price set by a monopoly producer is also $p=3$?
 - 1-5. If the monopoly producer's marginal cost is 2 which is a constant, what is the profit maximizing quantity and price of goods X for this monopoly producer.

2. Consider a cost function $C(q)=q^2+1$ where q is the amount goods Q produced by a firm.
 - 2-1. Derive the marginal cost function for a firm.
 - 2-2. Derive the average cost functions for a firm.
 - 2-3. Derive the supply function for a firm where price of goods Q is p .
 - 2-4. Derive the short-run industry supply function for goods Q where the number of firms is given by n . We assume that all firms have the same cost function. The amount of industry supply of goods is denoted by Q .
 - 2-5. Derive the long-run industry supply function for goods Q .

3. Consider an exchange economy where there are two goods X and Y and two consumers G and B. Both consumers are endowed with the same amount of goods X and Y, namely X^E and Y^E . Utility functions are $U^A(X^A, Y^A)$ for consumer A and $U^B(X^B, Y^B)$ for consumer B, where X^i and Y^i are the amounts of goods X and Y consumed by consumer $i=A$ or B, respectively.

3-1. Write the resource constraints for this exchange economy.

3-2. Write down the definition of Pareto efficient allocation of this exchange economy. In other words, write down the condition for an allocation $(X^{A*}, Y^{A*}, X^{B*}, Y^{B*})$ to be a Pareto efficient one.

3-3. If $U^A(X^A, Y^A)=X^A \cdot Y^A$ and $U^B(X^B, Y^B)=(X^B)^{1/3}(Y^B)^{2/3}$, what are the marginal rate of substitution for consumer A and B?

3-4. If $U^A(X^A, Y^A)=X^A \cdot Y^A$ and $U^B(X^B, Y^B)=(X^B)^{1/3}(Y^B)^{2/3}$, what are the conditions for an allocation $(X^{A*}, Y^{A*}, X^{B*}, Y^{B*})$ to be Pareto efficient?

3-5. If consumer A's amount of consumption for goods X is X^E under Pareto efficient allocation, then how much should be the consumer A's amount of consumption for goods Y? In other words if $X^{A*}=X^E$ then how much is Y^{A*} ?

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4. Fill in or choose appropriate words for each bracket in the following statements:

● In an expenditure-income model of income determination, the multiplier of an autonomous increase in investment expenditure is given by $1/(4-1)$.

● If government expenditure is increased and as a result national savings is $(4-2)$, it may lead to $(4-3)$ in interest rate and thus leads to decrease in investment expenditure. This is called $(4-4)$ effect of government expenditure increase.

● In a long-run, if money supply is doubled then $(4-5)$ will be doubled and all other real variables $(4-6)$. This is called $(4-7)$ of money.

● According to the expectation augmented Phillips curve, the rate of unemployment tends to be higher than $(4-8)$ if inflation rate is $(4-9)$ than $(4-10)$

5. Read the following article from The Economist magazine and answer questions from 5-1 to 5-4. For question 5-2, fill in an appropriate word for each bracket.

5-1. In inferring inflation rate, what data the three economists (Nakamura, Steinsson and Liu) used?

5-2. According to the three economists, China's official figures (5-1a) the inflation during 2007-8 but (5-1b) during 1996-2006

5-3. What was the major reason for (5-1a)?

5-4. What is the conjecture offered by the three economists in explaining (5-2b)?

China's official figures both understate and overstate inflation

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IS CHINA'S economy overheating? Not long ago, many people would have scoffed at the suggestion. The country is known for searing property prices, hot-money inflows and the steam escaping from its financial furnaces. The stock of outstanding credit, broadly defined, climbed to over 180% of GDP at the end of 2013, according to the central bank, and over 215%, according to an even broader measure by Fitch, a ratings agency.

But house prices are slowing, exports are weak and shadow banking is losing ground to traditional lending. Forecasters expected industrial output to grow by 9.5% in the first two months of 2014, compared with a year earlier; it grew by only 8.6%.

Moreover, evidence of excess has long been absent from the traditional measure of economic overheating: inflation. New figures suggest that consumer prices rose by only 2% in the year to February, well below China's average inflation of over 3% in the past decade. The prices paid to producers fell, again.

One way to reconcile the inflation number with other signs of excess is to disbelieve it. China's critics routinely argue that inflation is higher than the government's statisticians claim. But although it is easy to say the official figures are bad, it is difficult to quantify how bad.

That is the tricky task that Emi Nakamura, Jón Steinsson and Miao Liu of Columbia University set themselves in a recent study. They start with an economic law first observed by a 19th-century statistician, Ernst Engel: richer households spend a smaller share of their income on food. Thus as a household becomes richer over time, its spending pattern should match that of households who were equally rich a year or two before.

But in China, they discovered something different. They compared urban households in 2006 with households that were, according to the official figures, equally rich in 2008. They discovered that the later households were devoting 3-4% more of their budgets to food. Perhaps they were not quite as rich as their 2006 counterparts, after all.



The reason is that the cost of living rose faster in the intervening years than official figures suggested—much faster. The economists believe true inflation may have been as high as 20% in 2007 and 18% in 2008, compared with official figures of 4.8% and 5.9% (see chart). This dramatic increase in the cost of living partly reflects a spike in pork prices after an outbreak of disease fattened the price of hogs by about 60%.

Did the government simply lie about this price pressure? Possibly. But if so, its rationale is not clear. Understating inflation does not suppress the discontent it causes. The public pays more attention to the price of pork in the market than to data from the National Bureau of Statistics.

Moreover, it turns out that China's official figures do not always understate inflation. From 1996 to 2006, they actually exaggerated it in every year but one, according to the same method. As a result, urban consumption was growing even faster in this period than the official statistics conveyed. China's policymakers had more to boast about than they knew.

The inflation figures calculated by the three economists are also remarkably well correlated with the official numbers. They rise and fall in unison. It is just that the unofficial figures rise faster and fall further. The trio conjecture that two competing biases are at work. First, new goods are often of higher quality than the ones they replace, but their price is the same. That would explain why China overstated inflation before 2007. More subtly, statisticians sometimes fail to grasp that new goods are merely upgrades of existing ones. So they invent new categories; that biases inflation towards zero. As a consequence, China's official figures "present a smoothed version of reality," the authors write.

Those numbers do not, then, reveal the whole truth about China's economy, as the cynics point out. But their shortcomings are not simply statistical flattery. They are closer to statistical smooth-talk.

Name _____

1-1. _____ 1-2. _____

1-3. _____ 1-4. _____ 1-5 Quantity _____ Price _____

2-1. Marginal cost function _____ 2-2. Average cost function _____

2-3. $q(p)=$ _____ 2-4. $Q(p)=$ _____

2-5. $Q(p)=$ _____

3-1. _____

3-2. _____

3-3. Consumer A's MRS; $dY^A/dX^A=$ _____

Consumer B's MRS; $dY^B/dX^B=$ _____

3-4. _____

3-5. _____

4-1. _____ 4-2. _____ 4-3. _____

4-4. _____ 4-5. _____ 4-6. _____

4-7. _____ 4-8. _____ 4-9. _____

4-10. _____

5-1.

5-2a _____ 5-2b. _____

5-3.

5-4.

Solutions

- 1-1. $-X'(p) \cdot p/X$
- 1-2. $p \cdot (1 - 1/[-X'(p)p/X(p)])$ or $p(1 - X(p)/pX'(p))$ or $p - X(p)/X'(p)$
- 1-3. Price elasticity $3/2$;
- 1-4. Marginal Revenue 1
- 1-5. Quantity $3/2$, Price $7/2$

- 2-1. Marginal cost function; $2q$, Average cost function; $q/2 + 1/q$
- 2-2. Average cost function; $q/2 + 1/q$
- 2-3. $q(p) = p/2$ if $p > 2$
 $= 0$ if $p < 2$
- 2-4. $Q(p) = np/2$ if $p > 2$
 $= 0$ if $p < 2$
- 2-5. $Q(p) = \infty$ if $p > 2$
 $= [0, \infty]$ if $p = 2$
 $= 0$ if $p < 2$

- 3-1. $X^A + X^B = 2X^e$, $Y^A + Y^B = 2Y^e$,
- 3-2.
- 3-3. Consumer A; $dY^A/dX^A = -(Y^A/X^A)$, Consumer B; $dY^B/dX^B = -(1/2)(Y^B/X^B)$
- 3-4. $X^A + X^B = 2X^e$, $Y^A + Y^B = 2Y^e$, and $(Y^A/X^A) = (1/2)(Y^B/X^B)$.
- 3-5. $Y^{A*} = 4Y^E/3$

- 4-1. marginal propensity to save 限界貯蓄性向
- 4-2. decreased
- 4-3. increase
- 4-4. crowding out
- 4-5. price(s) (and wages)
- 4-6. stay constant
- 4-7. neutrality
- 4-8. natural rate of unemployment (or NAIRU)
- 4-9. lower
- 4-10. expected rate of inflation

- 5-1. expenditure share of various goods for the the same households

5-2a. understated 5-2b. overstated

5-3. rise in pork price

5-4. introduction of new goods or quality updates