14.01: Final Review
December 3, 2010

Unit 5: Market Power

1 Lecture 17: Oligopoly Continued (Chapter 12)

I. Cournot Math

- Cournot: All firms set quantities at the same time
- Calculate residual demand for a given firm and solve its profit maximization problem to find its best response function to other firms' output decisions.
- Solution is a set of quantities (one for each firm) that solves this system of equations.

II. Cooperative Equilibrium - Cartels

- Firms can form a cartel and behave like a single monopolist, maximizing total industry profits.
- Cartels are unusual because they are fundamentally unstable (incentive to "cheat" and raise own production) and because they are illegal (antitrust laws).

III. Comparing Equilibria

- In terms of welfare, usually Perfect Competition > Oligopoly > Monopoly
- Quantity as an indicator of social welfare
- DWL in welfare analysis comes from trades that aren't made

IV. Many Firms

- In Cournot, as number of firms $\to \infty$, Cournot equilibrium approaches competitive equilibrium
- As number of firms $\to 1$, approaches monopoly
- Markup over competitive price depends on number of firms and elasticity of demand:

$$\frac{p - MC}{p} = -\frac{1}{n\epsilon}$$

V. Price Competition

- Bertrand: firms set prices (instead of quantities) at the same time
- Two firms may be enough to remove market power (i.e. restore competitive outcome) if products are identical
- Recall proof from class that identical Bertrand duopolists drive price down to marginal cost
- Also recall the Stackelberg model where one firm set their quantity before the other firm. In this case, the best response function for the Stackelberg leader takes into account the fact that the follower will respond to the leader's output decision.

Unit 6: Topics in Intermediate Microeconomics

2 Lecture 18: Factor Markets (Chapter 15)

I. Competitive Factor Markets

- In SR and in LR, demand for labor will be its marginal revenue product

$$MRP_L = MR \cdot MP_L$$

where MR is marginal revenue from additional unit of output ($MR = p$ if competitive output market). These will differ in LR and in SR because MP_L in LR will take into account optimal capital adjustments.

- LR labor demand more elastic than SR

II. Monopsony

- Monopsony: single buyer in input market
- Barriers to exit (from factor market) create monopsony
- Competitive firms consider price of inputs, but monopsonist looks at *marginal expenditure*.

$$ME(q) = \frac{dTE(q)}{dq} = \frac{d[p(q) \cdot q]}{dq}$$

- Takes "poisoning effect" on inframarginal untis into account
- Increase input usage if ME<MRP, decrease if ME>MRP.
- Price comes from supply function
- Monopsonists underhire at lower wages relative to perfect competition

III. Application: Minimum Wage

- Higher minimum wages can restore competitive outcome in a monopsonistic market

3 Lecture 19: International Trade

I. What is International Trade?

- trade deficit = imports-exports

II. Comparative Advantage and Gains from Trade

- Differences in opportunity costs lead to comparative advantage in different goods
- When countries have different comparative advantages in production of different goods, there are potential gains from trade through specialization

III. Welfare Implications from International Trade

- In competitive model, opening to trade increases total welfare but usually at the expense of either consumers or producers
- Practice welfare comparisons using the usual graphs for imports and exports

IV. Trade Policy

- Effects of tariffs and quotas

4 Lecture 20: Uncertainty (Chapter 17, sections 1-3)

I. Decision-Making Under Uncertainty

- Expected utility: probability-weighted average of utility

$$EU = Pr(\text{Lose}) \cdot U(\text{Lose}) + Pr(\text{Win}) \cdot U(\text{Win})$$

- Different than utility of expected value, since utility functions usually concave (diminishing MU of income)

II. Extensions

- Concave utility (decreasing MU income) $\rightarrow$ risk averse

- Linear utility (constant MU income) → risk neutral
- Convex utility (increasing MU income → risk loving

III. Applications

- Insurance: risk averse people will pay money to turn a gamble into a certain payoff since they get higher utility from certain income than from a gamble with the same expected value
- Maximum amount they're willing to pay for this is their "risk premium"
- Lottery behavior is a puzzle – maybe risk averse at low incomes and risk loving at high incomes

5 Lectures 21 and 22: Capital Supply and Capital Markets (Chapter 16)

Lecture 21 - Capital Markets

I. Capital and Intertemporal Choice
- Supply of capital from household decisions about how much to save – increasing in interest rate
- Demand for capital comes from firms with potentially productive investments to make
- Intertemporal choice graph over consumption in period one (C_1 on x-axis) and in period 2 (C_2 on y-axis). Slope of the BC is $-(1 + r)$
- When r changes, effect on savings depends on relative size of IE and SE

II. Present Value
- Need to translate all future dollars into today's terms
- For a single payment of FV in year t:

$$PV = \frac{FV}{(1+r)^t}$$

- Value of a perpetuity – constant payment of f every period forever:

$$PV = f/r$$

- Importance of compunding
- Real interest rate r is the one we care about – the nominal interest rate i minus inflation π

$$r = i - \pi$$

Lecture 22 - Capital Markets II

I. Choices Over Time
- Choose option with highest present value when choosing between projects or investments

II. Investment Decisions
- Net Present Value (NPV) = PV of revenues - PV of costs
- Rule: Invest if NPV greater than zero
- if revenues R_t in each period and costs C_t, NPV of investment is:

$$NPV = \left[(R_0 - C_0) + \frac{R_1 - C_1}{(1+i)^1} + \frac{R_2 - C_2}{(1+i)^2} + \ldots + \frac{R_t - C_t}{(1+i)^t} \right]$$

- NPV decreasing in interest rate for projects with up-front costs and future payoffs

III. Increasing Savings
- Savings important for economic growth
- Government encourages savings using tax subsidies to retirement savings

Unit 7: Equity and Efficiency

6 Lecture 23: Equity and Efficiency (Chapter 10)

I. Equity and Efficiency

II. Choosing the Socially Optimal Allocation

- Social welfare function (SWF) can be though of as a utility function for society taking individual utilities as inputs
$$SWF = f(U_1, U_2, \ldots)$$
- Utilitarian SWF
$$SWF = U_1 + U_2 + \ldots$$
- Rawlsian SWF
$$SWF = min(U_1, U_2, \ldots)$$

III. Inequality in the US and Around the World

- See class handouts on inequality, poverty line, poverty rates over time

IV. Sources of Leakage

- Recall transfer program discussed in class – leads to decrease in labor supply especially among those who qualify or are originally near the cutoff to receive the subsidy.
- Distortionary taxation leads to DWL – this is the cost of redistribution

7 Lecture 24: Taxation and Redistribution

I. Taxation in the U.S.

1. Income tax (progressive, main tax in the U.S.)
2. Payroll tax (flat)
3. Consumption tax (regressive, paid on spending rather than earnings)
4. Property tax (tax on wealth)
5. Corporate tax (tax on businesses, small share of total tax revenue)

II. What Should We Tax?

- European countries raise most revenue through VAT on consumption
- Consumption taxes encourage savings but not progressive
- Excise taxes usually on "sin goods" (goods with negative externalities in consumption)

III. What is the Right Tax Rate?

- Tax revenues $= base \cdot t$
- As tax rate rises, base shrinks

$$\frac{d(\text{tax revenue})}{dt} = base + t \cdot \frac{d(base)}{dt}$$

- Laffer curve $\rightarrow$ tax revenue initially rising, then falling with tax rate (depends on elasticity of tax base)

IV. Low Income Programs in the U.S.

- Importance of targeting assistance programs
- Earned Income Tax Credit (EITC) is a wage subsidy program that balances targeting and efficiency

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