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| The Goods Market (by Ling) | |
| ***Overview*** | |
| The Goods Market I: Consumption & Saving | |
| Consumption & Saving | * Determinants of optimal consumption of a utility-maximizing consumer |
| Life-Cycle Model | * Pattern of income/consumption/saving over an individual’s lifetime |
| Intertemporal Choice | * Choices involving different periods of time * Assume forward-looking consumer who maximize lifetime satisfaction * Consumer’s choices are subject to intertemporal budget constraint |
| The Consumer’s Consumption-Saving Decision: A 2-Period Utility Maximization Problem | * Intuition/ Graph * Consumer utility maximization problem/ Budget constraint * First order derivative/ Lagraingan multiplier method |
| Government & Fiscal Policy | * Government decisions taken as exogenous * Government budget constraint * Fiscal policy |
| Ricardian Equivalence: Theory & Evidence | * Rationale consumer will save the increase in income from decrease tax cut, leaves government lump-sum tax cut with no-effect * However, in reality majority of consumers are short-sighted |
| The Goods Market II: Investment & Goods Market Equilibrium | |
| Investment & Desired Capital Stock | * Investment becomes capital with a lag * Desired capital stock is determined by MPKf and user cost |
| The Firm's Investment Decision: A 2-Period Profit Maximization Problem | * Profit-maximising firms decides on labour and capital income to maximise profit |
| Goods Market Equilibrium | * Goods market equilibrium condition: * Goods market equilibrium might not hold * Goods market equilibrium implies loanable funds market in equilibrium, vice versa |
| Loanable Funds Market & the Saving-Investment Diagram | * Loanable Funds Market reach equilibrium when savings = investment |
| Alternative: Keynesian Cross & the Income-Expenditure Diagram |  |

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| ***Definitions*** | | ***Formula*** |
| Consumption & Saving | | |
| Consumption | Goods and services purchased by consumers | Determined by optimal/desired consumption of a utility-maximizing consumer |
| Marginal propensity to consume | proportion of an aggregate raise in pay that a consumer spends on the consumption of goods and services, as opposed to saving it |  |
| Consumer preferences | Consumer preferences are given by the consumer's utility function | Indifference curve shows all combinations of c1 and c2 of the same utility (a person's satisfaction) |
| Saving | Current income not consumed |  |
| National saving | Private saving + public saving |  |
| Consumption-smoothing | The desire to have a relatively even pattern of consumption over time | ; |
| Rate of time preference | Also known as subjective discount rate, measures the discount of future utility, can be seen as a measure of consumer patient | higher indicates higher discounting factor and lower patience, higher meaning prefer future consumption.   |  |  |  | | --- | --- | --- | | increasing consumption profile | perfect smoothing; constant profile | decreasing consumption profile | |  |  |  | |  |  |  | |
| Discounting factor | Measures the worth of utility today | Inverse relationship with |
| Marginal rate of substitution (MRS) | The amount of c2 the consumer would be willing to substitute for one unit of c1 | On an indifference curve, utility is constant |
| Interest rate | Opportunity cost of current consumption |  |
| The Government | | |
| Government spending | Goods and services purchase by governments | Taken as exogenous |
| Government bond | Bonds issued by government to borrow money |  |
| Lump-Sum Tax | A tax for which the individual's liability does not depend upon behaviour | non-distortionary tax that does not change behaviours |
| Fiscal Policy | Consist of Government purchases and Taxes to stimulate economy/ control inflation |  |
| Fiscal Policy: Lump-sum Tax | A lowered tax rate today financed by increase future tax rate  Assume G1 and G2 unchanged | Opposing effects: |
| Ricardian Equivalence | A cut in lump-sum tax today has no effect on consumers' consumption choices or on the equilibrium real interest rate | Private households hold the entire tax cut + interest in anticipation of future tax rate increase |
| Crowding Out Effect | The reduction in investment that results when expansionary fiscal policy raises the interest rate | Since , S decrease when G increase, result in increased interest rate through loanable funds market and decrease I |
| Investment | | |
| Investment | Purchase of new capital goods by firms and new housings by consumer, and increases in firm's inventory holdings | Inventory Investment = Production - Sales |
| Desired capital stock | The amount of capital that allows firms to maximise expected profit | Investment becomes capital with a lag |
| Profit-maximising | The firm maximises the present value of stream of profits by choosing how many workers to employ and how much to invest |  |
| Profit | Profit = Revenue - Cost |  |
| Final profit | Firm's profit at shut down |  |
| Output | The total production by firm |  |
| Equation of motion for capital | Investment becomes capital with a one-period lag |  |
| User cost of capital | The expected real cost of using a unit of capital for a specified period of time |  |
| Desired Capital Stock | The optimal level of capital to achieve profit maximising output | , taking k1 as given, only investigate k2 |
| Calculation | | |
| Present Value | The amount today that is equivalent to an amount to be received in the future, taking into account the interest that could be earned over the interval of time | PV = |
| Future Value | Value in terms of dollars or goods in the future  The factor (1+r) is the price of c1 measured in terms of c2 | FV = x |
| Intertemporal Budget Constraint (simple) | Total resources available for present and future consumption  Incentives for future planning | Period 1:  Period 2: |
| Intertemporal Budget Constraint | Advanced version of the previous budget constraint, taking into consideration tax and dividends |  |
| Intertemporal Budget Constraint with Income-Leisure Decision | Combining the utility maximising objective of consumer and leisure requirement of consumer |  |
| Lagrangian multiplier | A strategy to find local maxima and minima of a function subject to a constraint | Single constraint  where f(x,y) is the function and g(x,y) is the constraint.  Solve for =0 |
| Euler Equation | An differential equation representing an intertemporal first order condition for a dynamic choice problem | where is the discount factor and r is interest rate |
| Hicks Substitution Effect | Investigate substitution effect by keeping the utility constant and change relative price | At the intermediate basket, and |
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| ***Graphs & max/min problems*** | | | |
| Consumption & Saving | | | |
| Solve for | * Determinants of optimal consumption of a utility-maximizing consumer | | |
| Parameters | * Intertemporal Budget Constraint * Consumer preference | | |
| Intuition | * A rational consumer wants to maximise one's utility while subject to intertemporal budget constraint | | |
| Math | Solve through first order derivatives or Lagrangian multiplier | |  |
| Graphs | |  |  |  |  | | --- | --- | --- | --- | |  | slope | y-intercept | x-intercept | | Budget Line | -(1+r) |  |  | | Indifference Curve |  | - | - | | |  |  |  | | --- | --- | --- | |  | Increase | Decrease | | Income  y1 | BL,  Saving | BL,  Saving | | Income  y2 | BL,  Saving | BL,  Saving | | Wealth  ω0 | BL,  Saving | BL,  Saving | | |
|  | |  |  |  | | --- | --- | --- | |  | | | |  |  |  | | income effect |  |  | | substitution effect |  |  | | overall | ambiguous |  | | |  |  |  | | --- | --- | --- | |  | | | |  |  |  | | income effect |  |  | | substitution effect |  |  | | overall |  | ambiguous | | |
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| ***Graphs & max/min problems*** | | | |
| Investment & Desired Capital | | | |
| Solve for | * Determinants of desired input (including capital) of a profit-maximizing firm | | |
| Parameters | * Profit maximising condition | | |
| Intuition | * A rational firm chooses the optimal level of input to maximise profit, considering the cost involved | | |
| Math | considering  Solve through first order derivatives | | common identity: |
| Graphs | |  |  |  |  | | --- | --- | --- | --- | |  | slope | y-intercept | x-intercept | | User Cost |  |  |  | | MPKf |  |  |  | | |  |  |  | | --- | --- | --- | |  | Increase | Decrease | | Interest rate  r | user cost  K\* | user cost  K\* | | Depreciation rate  d | user cost  K\* | user cost  K\* | | Price of capital  PK | user cost  K\* | user cost  K\* | | Technology  affects MPKf | K\* | K\* | | |
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| ***Graphs & max/min problems*** | | | |
| Loanable Fund Framework: Saving-Investment Diagram | | | |
| Solve for | * Determinants of optimal saving/investment quantity through loanable fund framework | | |
| Parameters | * market equilibrium condition | | |
| Intuition | * In a market equilibrium, the output equals to total desired demand. Which implies a equilibrium condition in loanable funds market * Note as assume government expenditure as exogenous | | |
| Math | Solve by investigating the equilibrium quantity of saving/investment and equilibrium price (interest rate) | |  |
| Saving vs Investment  Graphs |  | |  |  |  | | --- | --- | --- | |  | Increase | Decrease | | Output  Y | r | r | | Wealth | r | r | | Effective tax rate | r | r | | Technology  affects MPKf | r | r | | |
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