

Part I: Gross Domestic Product	
1. Intro	Classify resources of a region into 3 categories (factors of production) => Produce goods and services <ul style="list-style-type: none"> <li>Natural resources: "Gifts of nature" (e.g. Timber =&gt; Furniture, Fertile land =&gt; Agricultural products)</li> <li>Labor: All forms of works provided by people in the region, including entrepreneurship</li> <li>Capital: Goods produced not for household consumption, but for producing other goods or services</li> </ul>
	"The Gross Domestic Product of a country in a given period of time is the <u>market value</u> of all <u>final</u> goods and services <u>produced in the country</u> during the <u>period</u> "; Reflect aggregate econ. activity (econ. size) <ul style="list-style-type: none"> <li>Convert GDP in domestic currency into common currency (USD)</li> </ul>
	<b>Final goods and services:</b> Ignore intermediary goods (raw materials) => <u>avoid double counting</u> <ul style="list-style-type: none"> <li><b>Final goods:</b> <i>Category 1 + Capital goods</i>; Final good price already included cost of intermediate good</li> <li>Category 1: <u>Consumption goods</u> and services: Phone, fridge, hamburger, haircut</li> <li>Category 2: <u>Produced for the production</u> of other goods and services <ul style="list-style-type: none"> <li>A): Intermediate good: <u>Used up</u> or incorporated into the final product (Fabric, Leather, Plastic)</li> <li>B): Capital good: <u>Maintain own entity</u> after usage (Warehouse, garbage truck, weaving machine)</li> </ul> </li> </ul>
	Good can be both intermediate & final: Flour for local bakery, sell bread to market + self consumption
	<b>Produced in the country:</b> Only count the production by the country, ignore the market price by others! <ul style="list-style-type: none"> <li>Intermediate goods produced in the country but sold overseas: Int. good count as final, otherwise no</li> <li>Int. good produced overseas, final good sold domestically: <b>Deduct market price of overseas int. good</b> <ul style="list-style-type: none"> <li>Final good price already include price of overseas int. good, Price included production not by hk</li> </ul> </li> </ul>
2.1. Definition	<b>During the period:</b> Quarter or a year; Q: When is the good is actually <b>produced</b> in the <b>first hand</b> market? Property/Stock market: Only change of ownership, only <b>count for GDP in 1<sup>st</sup> hand market</b> , <b>not 2<sup>nd</sup> hand</b>
	<b>Inventory:</b> Goods produced but not sold, still counted in GDP => Sold later: Only count for produce GDP <ul style="list-style-type: none"> <li>Resold in 2014 with service fee of agent \$20. Then GDP of 2014 +\$20, service fee counted.</li> </ul>
2.2. Computation	A): <b>Nominal approach</b> (nominal GDP): Directly compute value of (definition) during the period <ul style="list-style-type: none"> <li>Affected by <b>market price of goods in that period</b>, cannot capture change in quantity effectively</li> </ul>
	B): <b>Expenditure approach:</b> $C + I + G + NX [IM - EX]$ ; No need to consider individual goods! (cash flow) <ul style="list-style-type: none"> <li>Consumption: Personal consumption expenditure <ul style="list-style-type: none"> <li>Total expenditure on consumption of goods and services by domestic households</li> </ul> </li> <li>Investment: Gross private domestic investment (<b>US: private investment</b>; HK + China: private + govt.) <ul style="list-style-type: none"> <li>Total expenditure on the residential properties in <b>first hand market</b> by domestic households</li> <li>Total expenditure on investment by firms operating in the industry <ul style="list-style-type: none"> <li>Business fixed investment: Capital goods in the first-hand market (factories, warehouse)</li> <li>Changes in business inventory (Market value of at end vs beginning of period)</li> </ul> </li> <li>Real investment (physical capital goods/inventory), not financial investment (stock, bonds)</li> </ul> </li> <li>Government purchase of goods and services: Expenditure of domestic government (goods, salary) <ul style="list-style-type: none"> <li>Purchase of goods and services + Transfer payments (CSS, Social Security Allowance)</li> <li><b>Transfer payment not counted into GDP:</b> Recipient of transfer payment not use for production</li> </ul> </li> <li>Net Export: C,G,I may (not) include goods and services produced by (sold to) foreign =&gt; IM (EX) <ul style="list-style-type: none"> <li><math>NX &gt; 0</math>: Trade Surplus; <math>NX &lt; 0</math>: Trade deficit; <math>NX = 0</math>: Balanced trade</li> </ul> </li> </ul>
3. Drawbacks	<b>Affected by exchange rate:</b> Even if there is no change of GDP in China (RMB), a pure <i>appreciation</i> of RMB relative to USD can increase the GDP of China in USD
	<b>May not capture all goods and services/total output produced:</b> Goods/services not sold in "markets" <ul style="list-style-type: none"> <li>Household production, Voluntary work, Informal/Illegal sector</li> </ul> <b>May not capture the change in output (quantity):</b> Nominal GDP distorted by price in current year <ul style="list-style-type: none"> <li>Real GDP: Control for the change in the prices: Use Q in current year, market price in base year <ul style="list-style-type: none"> <li>Advantage: Price constant =&gt; only reflect change in Q</li> <li>GDP reflect standard of living: Expenditure =&gt; Revenue =&gt; Income; <ul style="list-style-type: none"> <li>Still have other QoL factors not in GDP (e.g. WW2: GDP increase sharply due to G)</li> </ul> </li> </ul> </li> </ul>

Major macroeconomic events:

Credit crisis preceded by property over investment ('08); Asia Financial Crisis ('97); US Financial Tsunami ('07); Great depression (1929-1939)

Part II: Macroeconomic Issues	
Part II: Macroeconomic Issues	<p>4. Unemployment rate</p> <ul style="list-style-type: none"> <li>Working age population: Age 16 or above [15]; <math>UR = \#UP/\#LF</math>, <math>LFPR = \#LF/\#WRP</math>, <math>UEPR = \#UEP/\#LF</math></li> <li>Labor force (<b>Willing and available</b>): Employed persons + Unemployed persons;</li> <li>Employed persons: Anyone who has been working for pay or profit in the last 7 days</li> <li><b>Unemployed persons</b>: Have not (employed persons), <b>and</b> <u>have sought for working the last 30 days</u> <ul style="list-style-type: none"> <li>Youth highest: Those youth in labor force not have enough professional training</li> </ul> </li> <li><b>Discouraged workers</b>: Choose not to seek for work, gave up, prefer to work if possible (<b>HK: LF</b>, US no)</li> <li><u>Under-employed persons</u> (still employed!): <u>Prefer to work full time, but only get part-time jobs</u> <ul style="list-style-type: none"> <li>Those who involuntarily work for less than 35 hours during the last 7 days, <b>and</b></li> <li>(sought additional work in the last 30 days or available for additional work in last 7 days)</li> </ul> </li> </ul> <p><b>Drawbacks of UR</b>: Overstating employment situation due to discouraged workers =&gt; under-estimate LF</p> <ul style="list-style-type: none"> <li>Job market very bad for prolonged period =&gt; some unemployed go back to study full time (wait for job market to improve, while improving CV) =&gt; <b>discouraged =&gt; LF, UP decrease =&gt; UR decrease</b></li> <li>Initial claims of unemployment benefits: Indicate pace of which workers are laid off</li> <li>People not too worried about being laid off financially (US unemployment benefit, <u>financial cushion</u>) <ul style="list-style-type: none"> <li>Pay insurance premium when work, collect unemployment benefits when unemployed</li> </ul> </li> </ul> <p><b>Costs of unemployment</b>: Under-utilization of resources: Labor income, consumption, GDP</p> <ul style="list-style-type: none"> <li>Pressure on government budget: Low tax revenue (income), High expenditure (social welfare)</li> <li>Social costs: Individual (psychological), Increased crime rate, Social/Political unrest</li> </ul>
	<p>6. Types of unemployment</p> <ul style="list-style-type: none"> <li><b>Frictional unemployment</b>: ∴ Job matching process (time to find best possible job) (matching time) <ul style="list-style-type: none"> <li>Increase of unemployment benefits =&gt; f.u. ↑ (protected financially, can wait for a while)</li> </ul> </li> <li><b>Structural unemployment</b>: Due to structural change of the economy (outdated skills)</li> <li><b>Cyclical unemployment</b>: Due to short-term cyclical downturn of the economy</li> </ul> <p>Long term: <b>Frictional + Structural: Natural rate of unemployment (NRU)</b>; Always exist!</p> <p>Short term: Cyclical unemployment; Full employment: Only have NRU, cyclical=0, UR&gt;0</p> <ul style="list-style-type: none"> <li>Difference between UR and NRU: <b>Cyclical unemployment</b> (due to econ. downturn/expansion)</li> <li>UR&lt;NRU: Short term phenomenon: <b>Frictional unemployment decrease</b>, keen to employ (boom)</li> </ul> <p>Aim of classification: Create policies to address/attack different types of unemployment</p> <ul style="list-style-type: none"> <li>Structural: Retraining worker's skills; Cyclical: Stimulate economy (e.g. distribute cash, C↑)</li> </ul>
	<p>5. Price Index &amp; Inflation</p> <p><b>Consumer Price Index (CPI)</b>: Track the market value of a particular basket of goods/services over time;</p> <ul style="list-style-type: none"> <li>Base period, Basket is one purchased by a typical household in base period, <u>index at base year == 100</u></li> <li><math>CPI = (Basket\ Market\ value_{current\ year} \div Basket\ Market\ value_{base\ year}) * 100</math></li> <li>Inflation rate (<math>\pi</math>): <math>(Price\ index_t - Price\ index_{t-1}) \div Price\ index_{t-1}</math>; <b><math>\pi &gt; 0</math>: Inflation, <math>\pi &lt; 0</math>: Deflation</b> <ul style="list-style-type: none"> <li>Inflation (Deflation): Increase (Decrease) in the general price level (e.g. CPI)</li> </ul> </li> </ul> <p><b>Weakness and bias</b>: CPI may overstate true inflation! Assume quantity/goods in baskets fixed</p> <ul style="list-style-type: none"> <li>Substitution bias: Consumers buy fewer products that increase most in price, more which fall most</li> <li>Increase in quality bias: <math>\Delta</math>price may be due to both product quality improvement and pure inflation</li> <li>New product bias: New products between basket updates may change living cost</li> <li>Outlet bias: Price statistics are from traditional full-price retail stores (no discount/internet stores)</li> </ul> <p><b>Nominal income</b>: Income in \$ terms; <b>Real income</b>: Income purchasing power in terms of goods/services</p> <ul style="list-style-type: none"> <li>Real income (perfect answer) = Nominal income / Market value of Basket of Goods</li> <li>Real income (estimation, use when have no information of basket) = Nominal income / CPI</li> </ul> <p><b>Nominal interest rate</b> (<math>i</math>): Bank pays you for saving money, growth of wealth in nominal terms; <b><math>r \cong i - \pi</math></b></p> <p><b>Real interest rate</b> (<math>r</math>): Growth of wealth in real terms (purchasing power, quantity of goods and services)</p> <p><b>Significance</b>: Re: Asia financial crisis, Venezuela hyperinflation</p> <ul style="list-style-type: none"> <li>Source of risk for investors and borrowers, have to protect themselves (<math>r \geq 0</math>)</li> <li>Policy makers concerned about macro-economic effects of inflation/deflation: <ul style="list-style-type: none"> <li>Employees with fixed nominal salary: real income decrease =&gt; Social unrest; Currency crisis</li> </ul> </li> </ul>
	<p>6. Cycles</p> <p><b>Business cycles</b>: Short-term aggregate fluctuations of macro-economic variables (expansion/recession)</p> <ul style="list-style-type: none"> <li>Factors that affect the short-term fluctuations of macro variables</li> <li>Understanding of economic/financial crisis; role of government policies</li> <li>Policies to improve growth in LT and ST can be different: (e.g. cash distribution vs university subsidy)</li> </ul>

Part IV: Macroeconomic Wars	7. Trade War	<p><b>Common arguments for trade restrictions:</b></p> <ul style="list-style-type: none"> <li>• <b>Employment:</b> in order for the two countries to specialize, re-allocation of labor <ul style="list-style-type: none"> <li>◦ Domestic workers of imported good may not be able to compete with the ones from exports (have comparative advantage) =&gt; shut down operations, lay off workers</li> <li>◦ Exported good producers have a new market, more operations, hire more workers</li> <li>◦ Import/export skills are different =&gt; Workers cannot shift industry =&gt; Structural unemployment</li> </ul> </li> <li>• <b>National security:</b> Military weapons</li> <li>• <b>Infant industry:</b> Protect the development of [important] domestic firms for development <ul style="list-style-type: none"> <li>◦ Restrict foreign firms from entering until domestic firms have grown competitive enough</li> </ul> </li> <li>• <b>Unfair trade practices:</b> Govt. subsidy, dumping, restrictions for foreign countries, e, intell. property <ul style="list-style-type: none"> <li>◦ Dumping =&gt; sell goods at a lower price than cost =&gt; Under-cut other competitors, drive them out of business, face less competition in the future; Difficult to prove (not know cost)</li> </ul> </li> </ul> <p><b>Trade balance:</b></p> <ul style="list-style-type: none"> <li>• <b>Comparative advantage:</b> Total output of 2 goods ↑, consumers in both countries better off <ul style="list-style-type: none"> <li>◦ If trade deficit is due to comparative advantage, it is not a problem, as consumers benefit</li> </ul> </li> <li>• <b>Exchange rate:</b> Depreciation of domestic currency =&gt; reduce domestic quantity demanded for exports, export \$ higher, export to other countries higher demand (lower price) <ul style="list-style-type: none"> <li>◦ Law of one price: Price in whole world should be the same in equilibrium</li> </ul> </li> <li>• <b>National saving:</b> Private saving + National Saving = <math>Y - C - G</math>; <math>Y - (C + I + G) = NX</math> <ul style="list-style-type: none"> <li>◦ If the economy has low savings, it is spending more of its income on consumption =&gt; buy more imported goods and services, hence driving <math>NX &lt; 0</math>, trade deficit increase</li> <li>◦ Public saving: <math>T - TR - G</math>; T: Tax; TR: Transfer payment <ul style="list-style-type: none"> <li>▪ Budget position = Govt. budget = Govt revenue – Govt expenditure</li> <li>▪ +ve: govt budgt surplus, go into public saving; -ve: budget deficit, borrow by issuing debt</li> <li>▪ Government budget deficit ↑ =&gt; National saving increase =&gt; Trade (twin) deficit ↑</li> </ul> </li> <li>◦ Private saving: <math>Y - T + TR - C</math>; <math>Y - T + TR</math>: Disposable income;</li> <li>◦ US risks losing a trade war with China: Americans have been saving too less (saving behavior)</li> </ul> </li> <li>• Goods Efficiency: Japan forced to appreciate currency, but trade deficit did not ↓ significantly</li> <li>• US trade deficit with China: Not just brand names from China, but from various countries <ul style="list-style-type: none"> <li>◦ Factories opened by American companies in China production still counted as China export</li> </ul> </li> </ul>
		<p><b>Costs and benefits of the trade tariff on the US:</b></p> <p><b>Case 1:</b> Tariff imposed on consumption goods (e.g. shirt)</p> <ul style="list-style-type: none"> <li>• <b>Cost:</b> Consumers pay higher price for shirt from China (with Tariff) <ul style="list-style-type: none"> <li>◦ Consumers are worse off: Either pay higher prices (imports) or lower quality (domestic)</li> <li>◦ China can let currency depreciate to offset impact of tariff</li> <li>◦ China retaliates: Exports to China decrease, US producers suffer (employment decrease)</li> <li>◦ Cost to China: Factories moved =&gt; Employment ↓, investment ↓ (LT effect)</li> </ul> </li> <li>• <b>Benefit:</b> Less competition for producers in US =&gt; Charge higher price (profit) =&gt; employment ↑</li> </ul> <p><b>Case 2:</b> Tariff imposed in intermediate goods (e.g. steel)</p> <ul style="list-style-type: none"> <li>• Steel producers in US: Less competition from imports, charge higher prices (profit), employment ↑</li> <li>• Producers relying on steel input: cost of raw material ↑, profit ↓, less competitive, employment ↓</li> </ul>
Part III: Macro Models	8. Variables of a model	<p>Economic model: simplified world; Set of assumptions (market behavior/structure) and factors</p> <ul style="list-style-type: none"> <li>• Endogenous variables: “The variables that we try to explain/understand: Determined via the model” <ul style="list-style-type: none"> <li>◦ Solutions we seek in the model (e.g. Price and quantity traded)</li> </ul> </li> <li>• Exogenous variables: Variables we take them as given; We are not trying to explain/understand them <ul style="list-style-type: none"> <li>◦ Variables determined by the forces outside the model (e.g. weather, income)</li> </ul> </li> <li>• Analysis: Consider each exogenous variables one at a time, hold others constant (“Ceteris Paribus”) <ul style="list-style-type: none"> <li>◦ Positive analysis: Predict the consequence of an event without any value judgement (objective) <ul style="list-style-type: none"> <li>▪ Objective, fact based (can be tested/proved/disproved in theory, not necessarily practical)</li> </ul> </li> <li>◦ Normative analysis: Evaluate whether certain policies <b>should</b> be adopted: Value judgement <ul style="list-style-type: none"> <li>▪ Subjective and value based (cannot be tested (opinions))</li> </ul> </li> </ul> </li> </ul>

## Part IV: Aggregate Supply Curve

## 9. Production Technology

- Production technology:**  $Y = \theta \cdot f(K, N)$  e.g.  $f(K, N) = K^{0.3} \cdot N^{0.7}$  All variables in same  $t$
- $Y$ : Total output of goods and services of the economy (GDP)
  - $K$ : Total amount of capital in the economy (built and available)
    - Timeline of events: Real investment made in 2018, will be reflected in  $K$  in 2019
  - $N$ : Total amount of labor employed (determined by market)
    - Marginal product [of an input] of  $K$  and  $N$  is positive but diminishing
    - Marginal productivity of labor/capital is positive but diminishing:  $\Delta Y / (\Delta K | \Delta N) \downarrow$  as  $K | N \uparrow$ 
      - i.e. Ceteris Paribus, change in output from employing one more unit of some input
    - Increase in the amount of capital goods will increase the productivity of labor
    - Increase in amount of capital goods can increase the marginal product of labor
  - $\theta$ :  $>0$ , represents overall productivity of the economy (in that period, known at beginning)
    - Capture productivity shock (change in output given same labor and capital)
      - Technological innovation, education, weather, shortage of raw materials

**Full-employment output:**  $Y^F = \theta \cdot f(K, N^F)$ , long term concept (Re: NRU)

Exogenous variables:  $K, \theta$ , not depends on  $P$ ; Represented by vertical line on  $P$ - $Y$  space

An Increase in   Shift Full-Employment Curve		Reason (hold for each and every given $P$ )
Real Value of Assets held by the Households	Left	Real wealth $\uparrow$ , #ppl like to work $\downarrow$ , labor force $\downarrow$ , $Y \downarrow$
The preference for leisure	Left	#ppl like to work $\downarrow$ , labor force $\downarrow$ , $Y \downarrow$
Working Age Population	Right	labor force $\uparrow$ , output $\uparrow$
Increased capital stock	Right	capital available $\uparrow$ , output $\uparrow$
Positive productivity shock	Right	Productivity of labor $\uparrow$ , output $\uparrow$

## 10. SR Aggregate supply

**Aggregate supply curve:** relationship between general price level ( $P$ ) and aggregate output ( $Y$ ), that represents the outcome of the labor market given the production technology

$w = W/P$  ( $w$ : Real wage;  $W$ : Nominal wage, sticky;  $P$ : General price level/price index, flexible)

- $W$  determined by bargaining between employer and employees, “sticky”/fixed in SR, flexible in LR
- At the beginning of a period of time, firms forecast the price of output, and bargain  $W$  with labor
- $W$  increase with bargaining power. **Unemployment rate  $\downarrow$  (below NRU), Bargaining power  $\uparrow$**

Profit determination:  $E(P) \cdot \theta f(K, N) - W \cdot N - \text{other costs}$ ; Firms choose  $N$  ( $\leq N^F$ ) to maximize profit

An Increase in (exogenous variables to SRAS)   Shift the (SR) AS Curve   Reason		
Real Value of Assets held by the Households	Left	real wealth $\uparrow$ , labor supply $\downarrow$ , bargain power $\uparrow$ , $W \uparrow$ , Firm profit $\downarrow$ , Firm output $\downarrow$ , agg. output $\downarrow$ <b>(Fewer labor for same price)</b>
The preference for leisure	Left	labor supply $\downarrow$ , argument same as above
Working Age Population	Right	labor supply $\uparrow$ , bargaining power $\downarrow$ , $W \downarrow$ , profit of firm $\uparrow$ , firms output $\uparrow$ , aggregate output $\uparrow$
Increased capital stock	Right	profitability of firms $\uparrow$ , firm output $\uparrow$ , agg. output $\uparrow$ <b>More machines =&gt; more profit =&gt; more workers</b>
Positive productivity shock	Right	profitability of firms $\uparrow$ , firm output $\uparrow$ , agg. output $\uparrow$
Legislation / labor union size => bargaining power $\uparrow$	Left	bargain power $\uparrow$ , $W \uparrow$ , Firm profit $\downarrow$ , Firm output $\downarrow$ , agg. output $\downarrow$

- Treat each exogenous variables independent of each other
- If change is SR, affect SRAS but not full-employment output. Affect Full-employment output for LR

e.g. Typhoon:  $\theta \downarrow$ : capture negative productivity shock =>  $\theta$  decrease => SRAS shift left

$K \downarrow$ : capture decreased capital stock (broken machines) => SRAS shift left, F.E.O. decrease (long-term)

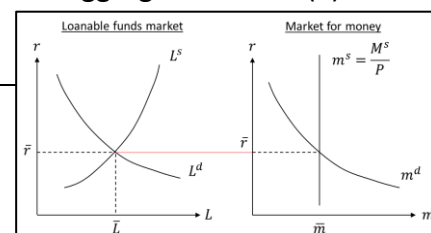
AS Upward slope: Case 1:  $P_1 > E(P)$ , hire more; Case 2:  $P_2 < E(P)$ , hire less

Firms can benefit from  $P$  increase; Output will increase and employment will increase

Over time, labor contract will be renewed (e.g. 3 months) =>  $W$  change, SRAS curve shift



Part V: Aggregate Demand Curve	11.1. Monetary policy	<p><b>Money:</b> Medium of exchange that (majority) sellers are willing to accept in exchange of goods/services</p> <ul style="list-style-type: none"> <li>Criteria: Unit of account/store of value (<math>\propto</math> Inflation)/standard of deferred payment (trade across time)</li> <li>Hold money (demand for money): To consume/buy goods/services; Consume: desire to hold money</li> <li>Opportunity cost of holding cash: Interest rate (property/stocks/bonds/deposits)</li> <li>Liquidity: how <u>quick</u>, how <u>costly</u> is it to convert an asset into cash (money is highly liquid)</li> <li>M1 (more liquid, cash, demand deposits) is subset of M2 (+ savings, time deposits)</li> </ul> <p><b>Monetary policy:</b> Change in money supply by <i>central bank</i> to affect the macro economy</p> <ul style="list-style-type: none"> <li>Expansionary: Increase nominal money supply, to stimulate economy</li> <li>Contractionary: Decrease nominal money supply, to fight inflation, slow down economic expansion</li> <li>Aim for 1-2% inflation: Buffer for deflation (rise real interest rate, increase burden of firms)</li> </ul> <ul style="list-style-type: none"> <li><b>Open market operations (OMO)</b> (advantage: reversibility) (Injection=Expansionary/Withdrawal) <ul style="list-style-type: none"> <li>Central bank buys/sells <i>existing</i> govt. debt securities from public, injecting/withdrawing public \$</li> <li>When buying, pay commercial banks in cash/raising deposit of commercial bank in central bank</li> <li>M1 increase through redeposit of s-t loans (money creation process); Assume no leakage/ex.res.</li> </ul> </li> <li><b>Required reserve ratio</b> (conventional) vs QE (unconventional) <ul style="list-style-type: none"> <li>RRR decrease, loan increase, redeposit increase [simple money multiplier (injection): <math>1/RR</math>]</li> <li>Inter-bank loan market: Banks that face shortage of reserves can borrow from other banks, under Interbank Loan Interest Rate (short-term, overnight), higher when reserves are tight</li> <li>IBLIR not determined by central bank, conduct OMO until achieve target rate (<math>\propto</math> com.b. deposit) <ul style="list-style-type: none"> <li>M1 increase, money supply increase, Bank reserve increase, IBLIR decrease</li> </ul> </li> </ul> </li> <li>Increase/decrease deposit interest rate at central bank <ul style="list-style-type: none"> <li>Japan: Negative interest rate; Penalty for commercial banks for holding excess reserves/not lend</li> </ul> </li> </ul>
	11.2. Saving and consumption of households	<ul style="list-style-type: none"> <li><math>C = a + b(Y + TR - T)</math>, hold liquid asset (Allocate a fraction of disposable income to consumption/saving) <ul style="list-style-type: none"> <li>Y: Gross income (income from factors of production, wage, profits); TR: Transfer payment; T: Tax</li> <li>b: marginal propensity to consume; <math>(1-b)</math>: marginal propensity to save. (<math>r \uparrow \Rightarrow</math> saving <math>\uparrow</math>, cons. <math>\downarrow</math>)</li> </ul> </li> <li>MPS: Saving, long term (10y) saving through financial sector <math>\Rightarrow</math> Supply of loanable funds in LF, <math>L^S</math></li> <li>MPC: Consumption, Hold asset in liquid form for transaction <math>\Rightarrow</math> Demand for money in MM, <math>m^d</math></li> </ul> <p><b>Loanable funds market</b> (financial sector): matches savers and borrowers in the economy</p> <ul style="list-style-type: none"> <li>L: amount of loan (real terms) available to firms in private sector; <math>r</math>: long-term real interest rate</li> <li>Supply of loanable funds <math>L^S</math>: national saving in a closed economy (public + private saving) <ul style="list-style-type: none"> <li>Public saving: Increase with budget surplus: [<math>\propto</math> Fiscal policy: govt. budget <math>\propto</math> macro-econ, sov.debt]</li> <li>Expansionary(contractionary): Increase(decrease) in expenditure, decrease(increase) in revenue</li> <li>Govt. budget is exogenous, independent of <math>r</math>; <math>m^d</math> independent G [match expenditure &amp; revenue]</li> </ul> </li> <li><math>L^d</math>: From firms in private sector, borrow to make real investment (Re: Time lag) <ul style="list-style-type: none"> <li>= real investment of firms at time <math>t</math> = amount of capital (<math>K</math>) in time <math>t+1</math></li> <li><math>r</math> increase <math>\Rightarrow</math> cost of borrowing increase <math>\Rightarrow</math> reduce expected profits <math>\Rightarrow</math> less willing to borrow</li> </ul> </li> </ul> <p><b>Market for money:</b> <math>m</math>: real balance of money; <math>r</math>: LT real interest rate   cannot distinguish <math>m^1/m^2</math></p> <ul style="list-style-type: none"> <li><math>m^S</math>: supply of money in real terms; nominal (<math>M^S</math>) determined by central bank, independent of <math>r</math></li> </ul>
	12. Aggregate Demand Curve	<p><b>Aggregate Demand Curve:</b> combinations of the general price level (<math>P</math>) and aggregate income (<math>Y</math>) that clear both the loanable funds and market for money</p> <ul style="list-style-type: none"> <li>Exogenous variables: <math>Y, M^S</math>; Endogenous variables: <math>r, L, P(m)</math></li> </ul> <p><b>Q-type: format for AD curve shift</b></p> <ol style="list-style-type: none"> <li>Pick initial <math>P, Y</math> in <math>P</math>-<math>Y</math> diagram (actual AD curve) So there is <math>(\bar{r}, \bar{L}, \bar{m})</math> that simultaneously clears LF, MM market</li> <li>(Identify which curve shift [<math>L^d/L^S/m^d/m^S</math>]) Ceteris Paribus, an increase in [factor] will shift [curve(s)], and the new eqm <math>r</math> in LF market is <math>r'</math> (state exogenous variable changes, with arrow and final equilibrium marked for curves and axis)</li> <li>At <math>r'</math>, the MM market is not in equilibrium. Hence, the price level has to increase from <math>P</math> to <math>P'</math> s.t. the real supply of money drops to <math>m^S</math>, s.t. the equilibrium interest rate in LF, MM market are the same</li> <li>Since the above argument holds for any given income level <math>Y</math>, the general price level has to go up for each and every given income level to clear both LF/MM markets. So AD Curve shifts up/down.</li> </ol> <p><b>AD Upward sloping:</b> <math>Y \uparrow \Rightarrow C \uparrow \Rightarrow m^d \uparrow</math>. <math>M^S</math> fixed <math>\Rightarrow</math> shortage of money <math>\Rightarrow</math> value of money <math>\uparrow \Rightarrow P \downarrow</math></p>



An increase in	Saving	Consumption	L <sup>s</sup>	L <sup>D</sup>	M <sup>s</sup>	M <sup>D</sup>	AD	Reason
Long-term real interest rate	Increase	Decrease						Higher return on saving (and higher cost of holding money or consumption)
Current Real Disposable Income	Increase	Increase	R			R		Households will allocate part of their “extra” income to saving (and the rest to consumption)
Real Value of Assets held by households	Decrease	Increase	L			R	?	Households feel that they are “richer”, feel they can save less and consume more (hold more money)  Case 1: M <sup>D</sup> increase small => Excess supply of M => Value of money ↓ => P↑ => AD shift up Case 2: M <sup>D</sup> increase much => Excess demand of M => Value of money ↑ => P↓ => AD shift down
Preference for immediate consumption	Decrease	Increase	L			R	?	Households’ attitude changes: prefer to consume more (and hence hold more money) and save less
Govt. Purchase Re: Crowding out effect <ul style="list-style-type: none"><li>G↑, r↑, L↓, I↓</li><li>ΔG↑ &gt; ΔI↓, GDP↑</li><li>I↓, K<sub>t+1</sub>↓, so pay cost in future</li></ul>			L			NA	U	Govt. spending ↑, public saving ↓, L <sup>s</sup> ↓ ⇒ drive up eqm. interest rate in LF market ⇒ P has to increase s.t. real supply of money drops until eqm interest rates in the market for money and the loanable funds market are consistent.
Expected real cost of production in the future other than the real interest rate in the period				L			D	Investment in capital goods now is expected to generate less real profit in the future => L <sup>D</sup> ↓ ⇒ drive down eqm. interest rate in LF market ⇒ P↓ s.t. real supply of money ↑, [...] consistent
Expected Productivity of Capital in the future				R			U	Capital goods are expected to produce more goods and services in the future => L <sup>D</sup> ↑ ⇒ drive up eqm. interest rate in LF market ⇒ P↑ s.t. real supply of money ↓, [...] consistent
The nominal money supply ( <i>M<sup>s</sup></i> ) (OMP, expansionary monetary policy) (by the central bank)					R		U	The money supply in real terms increases ⇒ equilibrium interest rate in market for money and loanable funds market not consistent ⇒ P↑ s.t. real supply of money ↓, [...] consistent
The general price level (CPI)					L			The money supply in real terms decreases

	Hong Kong	China	U.S.A.
M1	Currency (cash)+ Demand (checking account) Deposits	Currency + Demand Deposits	Currency + Travellers’ Cheques + Demand Deposits + NOW and similar interest bearing demand deposits
M2	M2=M1+Savings and Time Deposits with licensed banks +NCDs issued by licensed banks	M2=M1+Savings and Time Deposits	M2=M1+Savings and Money Market Deposits Accounts + Small Time Deposits + [...]

Part VI: Complete Keynesian Model	13. Complete Keynesian Model	<ul style="list-style-type: none"> <li>Macro model: Labor market (not to be distinguished by different collars), Output market (goods), Loanable funds market (stocks, commercial banking), Market for money (currency)</li> <li>Equilibrium in the loanable funds market is consistent with equilibrium on the output market</li> <li>Endogenous variables (intersection): Real GDP (Y), General price level (P), Unemployment rate</li> <li>SR Eqm (nominal wage is “sticky”): Intersection of SRAS curve and AD curve</li> <li>LR Eqm (nominal wage is flexible): Intersection of LRAS curve and AD curve.</li> <li>Analysis starts from an economy which is at both LR and SR eqm (i.e., intersection of LRAS, SRAS, AD)</li> <li>As long as SR output deviates from full-employment output, SRAS will gravitate towards full employment output regardless of price level (by bargaining power) <ul style="list-style-type: none"> <li>in SR, SRAS can go beyond full employment output: negative cyclical unemployment</li> </ul> </li> <li>From Y, we can know N (formula) =&gt; Higher Y, Higher N, Lower unemployment, Higher bargain power</li> <li><b>Long-term economic growth:</b> Ignore SRAS, focus on LRAS shift; <math>Y^F = \theta \cdot f(K, N^F)</math> <ul style="list-style-type: none"> <li><math>N^F</math>: Depend on labor force, which depends on working age population <ul style="list-style-type: none"> <li>Policies that raise the birth rate and increase the working age population</li> </ul> </li> <li><math>K</math>: Loanable funds market, raise funds to finance real investments <ul style="list-style-type: none"> <li>Development of the financial sector, regulations that ensure the well-functioning of the financial sector =&gt; facilitate flow of funds from the savers to the firms that will make real investment</li> <li><math>K \neq</math> investment; Composed of [financial system: saving-investment] + [foreign direct investment]</li> </ul> </li> <li><math>\theta</math>: In reality can be endogenous, represent quality of workforce and production technology <ul style="list-style-type: none"> <li>Investment in education, research and development to increase <math>\theta</math> in future</li> <li>Rules and regulations that protect intellectual property (patent) =&gt; incentive for development</li> <li><math>\theta \uparrow \Rightarrow K \uparrow</math>, sustainable; Diminishing product =&gt; Increase N, K <i>alone</i> unsustainable</li> </ul> </li> </ul> </li> <li><b>Business cycles (economic recession/expansion) &amp; Stabilization policies:</b> Hold LRAS const, AD/AS shock <ul style="list-style-type: none"> <li>Recession: AD shift left, Move down along SRAS, Unemployment <math>\uparrow</math>, [...], SRAS shift right until <math>Y^F</math></li> <li>Expansion: AD shift right, Move right along SRAS, Unemployment <math>\downarrow</math>, [...], SRAS shift left until <math>Y^F</math></li> <li>Stagflation: Recession associated with inflation, SRAS shift left =&gt; Eventually SRAS back to initial</li> <li>Stabilization policies: Long time for SRAS shift. Expansionary fiscal/monetary policy =&gt; AD shift right</li> </ul> </li> </ul>
	14. 2008 Subprime Crisis	<li><b>Mortgage backed securitization:</b> Commercial banks selling ownership of mortgages they originate <ul style="list-style-type: none"> <li>Commercial banks raise funds from accepting the deposits from the savers. They use the funds raised to lend to the borrowers (e.g. mortgage borrowers) who borrow the loans to buy properties</li> <li>Mortgage: long-term, interest rate higher than short-term interest rate</li> <li>Transaction benefits: Convert mortgage to cash, MBS Service fee (Origination/Installment collection)</li> <li>Long-term MBS safer than other LT financial instruments (stocks/properties) =&gt; popular in market</li> </ul> </li> <li><b>Investors:</b> Borrowing short-term funds to finance purchase of MBS (long term interest) <ul style="list-style-type: none"> <li>Profit from interest difference of short-term loans (low) and long-term mortgages (high)</li> <li>Have to keep “rolling over” ST loans, as the mortgage has not completely covered cost yet <ul style="list-style-type: none"> <li>Risky: investors concerned that income of MBS unstable =&gt; unwilling to lend =&gt; cannot roll-over</li> </ul> </li> <li>Commercial banks: More willing to originate MBS, less strict [subprime] as security is sold to 3<sup>rd</sup> party</li> </ul> </li> <li><b>Immediate trigger of subprime crisis:</b> '04-'06: Fed started to raise Federal Funds Rate <ul style="list-style-type: none"> <li>Increase installment payment of mortgage loans =&gt; Subprime borrowers default</li> <li>Investors refuse to lend ST loans to investment banks =&gt; bankrupt (cannot roll-over ST debt)</li> </ul> </li> <li>Commercial banks reluctant to extend new mortgages =&gt; property demand <math>\downarrow</math> =&gt; property price <math>\downarrow</math> <ul style="list-style-type: none"> <li>“Real value of assets held by households” <math>\downarrow</math>, <math>L^S</math> shift right, <math>M^d</math> shift left [<math>M^d</math> shift small =&gt; AD <math>\downarrow</math>]</li> </ul> </li> <li>Large investment banks bankrupt =&gt; investors concerned =&gt; stock market/prices crash <ul style="list-style-type: none"> <li>“Real value of assets held by households” <math>\downarrow</math>, <math>L^S</math> shift right, <math>M^d</math> shift left</li> </ul> </li> <li>Commercial banks suffered loss on the mortgage loans =&gt; more conservative =&gt; lend less <ul style="list-style-type: none"> <li>“Willingness to lend” <math>\downarrow</math> =&gt; <math>M^S</math> shift left, AD shift down</li> </ul> </li> <li>Investors more conservative in investing/lending to firms, more difficult/costly for firm to raise funds <ul style="list-style-type: none"> <li>“Expected real cost of production” <math>\uparrow</math> =&gt; AD shift down</li> </ul> </li> <li><b>Monetary policy:</b> Zero interest rate, OMP, Quantitative easing (large scale) =&gt; <math>M^S</math> shift right, AD shift up <ul style="list-style-type: none"> <li>G.db.sec: Treasury Bills (T-notes) [ST], Treasury Notes (T-Notes) [MT], Treasury Bonds (T-Bonds) [LT]</li> </ul> </li> <li><b>Fiscal policy:</b> Expansionary; Increase G, Decrease tax =&gt; Shift AD upwards</li>