# 2021 Notes – Macro Models – AD-AS

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## List of Definition

### **Aggregate Demand**

* + - **The** total quantity demanded of all goods and services at different price level made in an economy, ceteris paribus.
		- It also represents the total expenditure of the economy
		- AD = C + I + G + (X - M)
		- AD-AS diagram (stock concept – qty based)/

 **Aggregate Supply**

* + - The quantity supplied of all goods and services at different price levels, ceteris paribus. (Upward-sloping from left to right)
		- It is also the total output of goods and services that the entire economy is producing and would sell at each price level.
		- Keynesian range (constant cost), increasing cost, full employment level.

### Nominal Consumption Expenditure

* + - Refers to the expenditure made by consumers on the finished consumer goods which consists of induced (⭡C due to ↑Yd) and autonomous consumption (independent consumption), before discounting for inflation, expressed at current year price level.
		- Consumption function, C = a + (MPC) Yd.

### Real Consumption Expenditure

* + - Refers to the expenditure made by consumers on the finished goods after discounting for inflation, expressed at base year price level.

### Nominal Investment Expenditure

* + - Nominal capital goods or assets which are for the production of finished goods which consists three types of components before discounting for inflation, expressed at current year price level.(Business fixed investment. Residential
		- investment, Business inventories).

### Real Investment Expenditure

* + - Refers to expenditure on goods that are capital goods or assets which are for the production of finished goods after discounting for inflation, expressed at base year price level.
		- Real Investment = Nominal Investment x $\frac{Base Year Price Index}{Current Year Price Index}$

### Government Expenditure

* + - It refers to purchases of goods and services that the government spends in ordinary and development expenditure in areas such as defence and education. It is assumed to be autonomously determined.

### Export Revenue

* + - The revenue that the economy creates from the sales of domestic goods and services to the foreign nations.

### Import Expenditure

* + - The expenditure made by the residents and citizens of the local economy on the goods and services that are bought from the foreign nations.

### Balance of Trade

* + - The difference between the revenue earned by the local economy from the sale of the domestically produced goods and services to the foreign and the expenditures made by the domestic sector on foreign-produced goods and services.
		- Export revenue minus Import expenditure (X – M).
		- **Total Trade = (X+M), total trade to GDP ratio is 5 times for Singapore**
		- **Export revenue is 3 time to GDP**
		- **It implies that Singapore has a high reliance on trade for economic growth – need large foreign market for growth and need extensive resource for potential growth (expansion of availability or resources or production capacity)**

### Market Equilibrium of National Income

* + - It refers to the market equilibrium level of national income is attained when the economy is under stable market condition **whereby the market output level is equal to the aggregate market demand**, after adjusting the unplanned stock to clear excess demand or supply condition. At this level of market condition, there is no tendency of change in the level of national income unless there is a change in the level of economic activities. (AD =AS)

increase in national income

* Increase in production –

Real GDP

AD­1

AD2

AD­0

Y0 = Y1

= YF

Y2

AS

GPL

* Increase in

demand for labour – increase

in employment

P1

### Circular Flow of Income

* + - It refers to the flow of injections and withdrawals that will affect the level of transactions and output which will affect the level of national income through the multiplying effect.

National Income / expenditure

Households

Firms

Consumption/
Output

Savings

Financial Market

Investments

Imports

Taxes

Exports

Government Expenditure

Government

Foreign Market

withdrawals and injections

### Flow of National Income

* + - It refers to the different ways on how the level of national income is attained which can be based on the output approach, income approach and expenditure approach.

Household

Firms

Factor Services

Expenditures

Product

Factor income

### Multiplier Effect

* + - It is the ratio of the **change in income to the change in autonomous expenditure that brings about the change in income.**
		- It determines the amount of change in national income as a result of a change in aggregate expenditure.
		- K=△NY/△AD - > change in AD X K = change in national income

↑G(100m)x2 (k) = 200m (△NY)

**K = 2 as 1 / MPW = 2 when MPW = 0.5**

* + - The extent of the multiplier effect depends on the withdrawal effects at various levels of transaction in the circular of income
		- **In the multiplier process**, the initial increase in the aggregate expenditure expands the circular flow of income and then increasing the income of the factor earners which will further expand the circular flow of income with new consumption activities. As long as more consumption activities take place, the circular flow of income will continue to expand at the respective level of economic activities until the withdrawal effect is equal to the initial injections which will cease the expansion of the circular flow of income. Consequently, the national income will increase by several folds, depending on the value of the multiplier which is determined by the sum of the MPW (Marginal Propensity to withdraw - MPS + MPT +MPM)

### Reverse Multiplier Process

* In the reverse multiplying process, the initial reduction in the aggregate expenditure contracts the circular flow of income and then, reducing the income of the factor earners which will further contract the circular flow of income as consumption activities reduces. As lesser consumption activities are made, the circular flow of income will contribute to contract at the respective level of economic activities until the withdrawal effects is equal to the initial reduction in injection. Consequently, the national income will decrease by several folds, depending on the value of the multiplier which is determined by the sum of MPW (Marginal Propensity to Withdraw = MPS + MPT + MPM)

### Explain how the size of the multiplier is determined

* The value of multiplier is determined by MPW or MPC as stated in the formula below:

$$k= \frac{1}{MPW}= \frac{1}{MPS+MPT+MPM}= \frac{1}{1-MPC}$$

* Therefore, the determinants of the MPW or MPC will indirectly be the determinants of the multiplier.
* For MPC, (marginal propensity to consume) it is influenced by factors like the **availability of credit facilities, degree of affluence, size of population and consumer behaviour.**
* For MPS (marginal propensity to save), it is affected by the **attitude towards savings, legislation (compulsory CPF Scheme), level of welfare (better welfare system, less need and willingness to save).**
* For MPM (marginal propensity to imports), it is influenced by factors like the degree of reliance on imported resources and the availability of domestic natural endowments.
* For MPT (marginal propensity to tax), it is influenced by the tax rate set by the government
* **For SG – high MPS and MPM – compulsory CPF saving and keen attitude to save (very little social welfare) / small country with very little resources – depend on imports for survival**
* **Country with huge middle income group and high MPC – huge consumption level. – US is driven by consumption activities**

# Main Areas of Discussion

## 2. Equilibrium level of National Income

* It refers to the market equilibrium level of national income is attained when the economy is under stable market condition whereby the aggregate supply (market output level) is equal to the aggregate demand after adjusting to excess demand or supply condition. At this level of market condition, there is no tendency of change in the level of national income when there is change in the level of economic activities

## Derivation of equilibrium level of National Income based on AS-AD analysis

1. Based on the notion of AS-AD analysis, the equilibrium level of national income is determined when the Aggregate Demand (AD) intersects with the Aggregate Supply (AS), which will determine level of real GDP and price level
2. Any changes in the aggregate demand and aggregate supply will contribute to the changes in the equilibrium level of national income

ASF

AD2

AD1

AD0

GPL

Real GDP

Y2

Y0=Y1=YF

P1

P0

P2

* when you describe the situation to curb inflation to lower AD1 to ADo, AD1 to AD2 means curbing inflation at the expense of reduction in real GDP (AD1 to Ad2 - use it to explain why the contractionary policy should not be too excessive) – curb inflation but there is a fall in real GDP – decrease in production – decrease in demand for labour – rise in unemployment
* when you describe the situation to curb recession and raise employment should use AD2 to ADo. ADo to Ad1 will show that there should not be excessive expansionary policy as it will contribute to inflation – (rise in GPL but no increase in real GDP)
1. At this level of equilibrium national income, the economy may have attained full employment at E0 where AD0 equals to AS and the real GDP is at Y0=YF while price level is at P­0. When the economy attains equilibrium at E1 due to rise in AD, where AD1 equals AS, the economy is experiencing inflation as the real GDP does not increase but only the price level has increased from P0 to P1. If the economy attains equilibrium at E2 due to decrease in AD, where AD2 equals to AS, the economy is experiencing unemployment as the real GDP and the price level have both decreased.
* **Use AD-AS analysis to explain how the economy can attain higher economic growth rate (higher real GDP)**

**Explain how employment can be raised through Ad – As**

**Explain how inflation occurs through AD- AS**

Why conflicting aims occur?

1. Inflation and unemployment (economic growth)

2. Economic growth and unemployment

## 2.1 Characteristics of Aggregate Demand(C+I+G+(X-M))

### 2.1.1 Slope of AD (Downwards Sloping)

* + - Holding other factors constant, at a higher price, quantity demanded of goods is lower.
		- The inverse relationship of price and quantity demanded is shown by a downwards sloping AD curve, influenced by wealth effect, interest rate and substitution effect of foreign goods.
		- Wealth effect
			* A decrease in price 🡪 ↑ purchasing power for the consumer 🡪increases the demand.
			* Therefore, as price decreases, quantity demanded increases.
		- Interest rate effect
			* A higher price leads to increase in demand for money 🡪interest rates increases 🡪 consumers are less willing to borrow for investment or expenditure 🡪 quantity of goods demand decreases
		- Substitution of foreign goods (holding foreign price constant)
			* Increase in price of local goods 🡪 consumers purchase more of available foreign substitutes 🡪 quantity of local goods demanded drops

**The slope of Aggregate demand is determined by the interest rate, income effect and substitution effects of foreign goods and it is downward-sloping.**

## 2.3 Characteristic of Aggregate Supply

### 1 Slope of AS

* + - Upwards then vertical
			* Affected by the different conditions at different stages of production
			* An increase in output is usually followed by an increase in cost of production. (Law of diminishing returns)
			* Limitation to capacity makes increase in per unit of output more expensive.
			* As employment reaches the full capacity, higher prices do not result in increase output (increasing cost condition)
			* At this point AS is perfectly inelastic, indicating full employment condition

AS0

GPL

0 – Y0 - Constant Cost Condition

Y0 – Y1 – Rising Cost Condition

Y1 – Y2 – Full Employment Condition

Y1 = Y2

= YF

Y0

0

Real GDP

### 2.3.2 Determinants of Aggregate Supply

* + - Input prices
			* Increase in input prices 🡺 increase cost of production 🡺 shifts AS left
		- Quality of labour
			* Education and training increases effectiveness of labour 🡺 able to produce more goods with the same amount of labour 🡺 cost of production decreases 🡺 AS shifts to the right
		- Expected inflation
			* Expected increase in price 🡺 producers will want to sell more goods in period of higher price 🡺 quantity produces decreases in current period 🡺 AS shifts left
		- Technology
			* An advancement in technology lowers cost of production 🡺 AS shifts to the right
			* Raise efficiency 🡺 increase productivity – lower cost of production - shift AS to the right

### **2.4 Impact of Change in Aggregate Demand and Aggregate Supply**

### 2.4.1 Explain how a change in aggregate demand will affect the general price level (GPL) and the real GDP (to depict demand-pull inflation)

ASF

P3

P2

P1 = P0

Y0

Y1

Y2=Y3=YF

Real GDP

GPL

AD3

AD2

AD0

AD1

As seen from the diagram, the rise in aggregate demand from AD0 to AD1 will only cause an increase in real GDP from Y0 to Y1 without any change in price level as price is at P1 which is equal to P0. As the aggregate demand rises further from AD1 to AD3 where the supply condition is at rising cost condition or full employment level, there will be excess demand condition which will contribute to rise in price level from P1 or P3 as the real GDP will rise from Y1 to Y2 but remains at Y3 when there is full employment level.

## Importance of the respective aggregate demand components

### Consumption

* + - Consumption is often used as a measurement for welfare of citizens in the country. A rise in disposable income will raise the level of consumption, enabling higher level of material comfort which will raise the level of SOL
		- Consumption is one of the sources of contribution of the growth of GDP (especially for large and affluent economy with extensive credit facilities)
		- Consumption will induce product innovation as new forms of consumption will demand the producers to produce new forms of products, widening the scope of economic growth
		- Consumption will create an acceleration effect on the economy which will generate a higher level of employment (Increase in NY🡪↑C🡪↑I, ∴↑NY - ↑I) (Induce rise in investment 🡪 depends on whether change in income and consumption is permanent.)
		- It will also include an increase in domestic activities which will help expand the domestic expenditure and production and then, provides greater employment, reducing the degree of dependency on external demand
		- **Significance of consumption is amplified by:**
1. size of the economy
2. level of affluence – influenced by the degree of distribution of income
3. level of expectation
4. level of credit availability

### Investment

* + - Investment directly increases employment of the country, increasing national income at the same time. (↑ in production – labour intensive industries)
		- Investment in new areas of the economy will widen the scope of the economy and thus providing a wider range of job opportunities
		- Investment will also provide massive employment opportunities when the investment is focusing on the manufacturing sector. (Countries like India/China – critical factor for social/political stability)
		- ↑I 🡪↑ Production🡪 ↑ employment 🡪 ↑ Real GDP 🡪 ↑ Real GDP per capita (↑ SOL)
		- Investment infrastructural development will provide better facilities that will raise the level of convenience and comfort of their lives and thus, raising the standard of living.
		- Investment improves the infrastructure of the country facilitating economic growth. (reap EOS 🡪 ↓LAC 🡪 ↑ profitability) Infrastructural investments improve the attractiveness for foreign direct investment (FDI)
		- Investment in R & D will lead to higher level of efficiency and improvement in the quality of products which will raise the competitive edge of the economy
		- It will also lead to the transfer of technology when the investment is in the form of FDI which will raise the skill level of the workers and enhance the technological knowhow of the economy.

### Savings

* + - Savings provides the capital for investment and source of fund for the government for public expenditure (CPF)
		- Higher level of savings will also provide more sovereign fund for the economy to generate more wealth for the country. This will enable to the economy to have more fund for public expenditure to raise the efficiency of the economy and the standard of living. Besides this, the fund can also provide more funding for the economy to counter economic crisis.
		- Saving helps in the social planning for retirement and family development 🡪 promote social stability

### Government Expenditure

* + - Government expenditure is used to improve infrastructure for the country to raise the efficiency of the industries and provide a higher level of standard of living
		- A kind of injection to improve liquidity of the financial market in times of insolvency
		- Able to indirectly boost consumption through the increase in the disposable income that will provide a higher level of purchasing income
		- Act as a remedy solution to solve deflationary condition

## Using AS- AD analysis, explain how the rise in oil price and global recession will affect the national income level

* state that the equilibrium level of NY based in AS-AD analysis is attained when the AD intersects AS and this will determine the level of real GDP at Y0 and the price level (GPL) at P0 where Y0=YF, assuming that full employment is attained as seen from the diagram.
* State that the rise in oil price implies an increase in cost of production which will lead to a shift of the AS0 to AS1.
* State that the global recession will lead to a decrease in AD from AD0 to AD1, as it will affect export demand and inflow of FDI
* As a result, it is noted that the real GDP will fall from Y0 to Y2 and the price will remain at P0, given that the reduction in AD is equal to the reduction in AS.
* In the event that the fall in AD is greater than reduction in AS, the fall in the real GDP from Y0 to Y3 will be greater and there will be a fall in price level from P0 to P2.

AS

AD0

AD1

AD2

Real GDP

Y0=YF

Y2

Y1

P3

P1

P2=P0

GPL

Y3

Fig: Impact of a rise in oil price and a global recession