EC 140 Test 1 Cheat Sheet
complete version v1.2

GDP = Y
National product is stuff produced by economy over timespan. National income is the dollar value of stuff, measured as GDP.

Firm's value added is payments to other firms and is contribution to GDP.

GDP isn't perfect. Does not account for illegal or black markets, leisure, "bads". Adjusting for **real GDP** is better, to account for inflation. Stuff with no clear market value is counted at cost.

All variables ACTUAL/REAL

Income Side: Y = Net domestic income (**NDI**) + Depreciation + Indirect Taxes − Subsidies.

NDI = Wages + Interest + Business profits

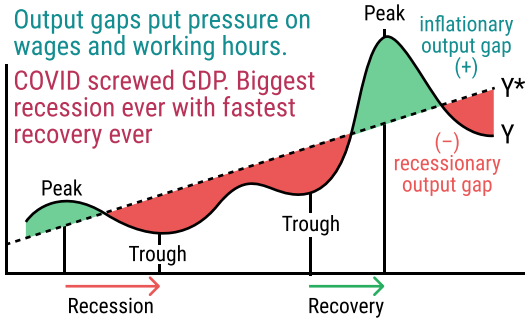
Expenditure Side: Y = $C_a$onsume + **I_a**nvestment + **G_a**vmt + **EX_a**ports − **IM_a**ports.

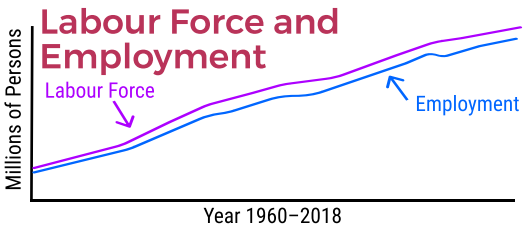
Investment = Net Invesment + Depreciation: not "investing" but inventory, plants, and equipment. Count only government purchasing from firms, not all spending.

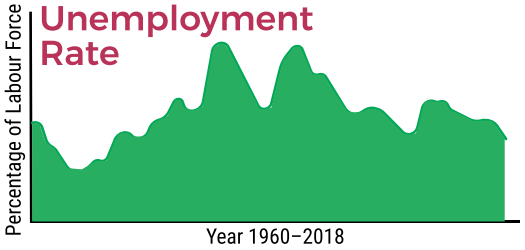
Business Cycle
Regular short-run GDP fluctuations. Measure actual vs **potential GDP** (**Y***) with full employment. **Output gap** = %diff = $\frac{Y - Y^*}{Y^*} \times 100\%$

Recession is decreasing output gap, **recovery** when increasing. **Depressions** are long recessions. **Peak/trough** when GDP hits local min/max.

Output gaps put pressure on wages and working hours.







Intro
Macro is basically just lots of long-term trends. Things that change over time are measured as **indices** calculated by current/base out of 100. **Percentage change** measures the difference between two values as a percent of the original value.

Capital
Price level is the average price of **everything**. Money printer go *brrr* and the power of money go down as price level go up.

Prices in today dollars are **nominal.** Prices indexed against a particular base year is **real**.

Real national income is the quantity produced now @ base year prices.

Measure price of the **same** stuff relative to some year as the **CPI**, which is **calculated as an index**.

For any index, **deflator = nominal/real**. Note deflator is also a (price) index.

Inflation is **% change in deflator index**.

Or, deflator = last year deflator × inflation

Negative inflation is **deflation**. Decreasing inflation is **disinflation**. **Real interest = nominal − inflation.**

People plan for normal, **anticipated** inflation. If price level goes up before people plan, inflation is **unanticipated**, like being paid back in weaker dollars.

Exchange rate is the price in Canadian dollars to buy one of another currency.

A currency becoming more valuable with respect to another is **appreciating**, less valuable is **depreciating**.

Trends Before Covid
There has been an upward trend in the **labor force**, thus unemployment and employment has risen steadily. **Actual GDP** has stayed around **potential GDP.**

The **unemployment rate** has **no long term trend**, it goes up and down.

Post-Apocalypse 2020
In 2020, **b fell**, **I_0 fell**, **MPSave rose**.

AE < Y but firms could not increase production to return to equilibrium, in turn, we experienced a **big** recession. This meant that **real GDP dropped**.

T_0 fell because CERB is a transfer, which acts like a negative tax that does not change based on income.

Your Notes Here

$$\frac{\text{current}}{\text{base}} \times 100 \text{ Index formula} \qquad \frac{\text{new} - \text{old}}{\text{old}} \times 100\% \text{ \%change formula}$$

Labour
Measure the **labour force** by summing the number of **employed** (age 15+ w jobs) and **unemployed** (15+ and job searching).

Unemployment rate is the percent of the labour force unemployed. At **full employment** (maximum potential), there is still unemployment: **frictional** from normal turnover and **structural** from mismatch between skills supplied and demanded in factor markets. Employment figures are **seasonally** adjusted for regular fluctuations in the year. **Cyclical** unemployment is normal from the flow of the business cycle.

Productivity is **GDP per unit labour**, with units of people (worse) or hours worked (better).

Macro Model™
All variables DESIRED

AE = C + I + G + X − IM (same as GDP expenditure side)

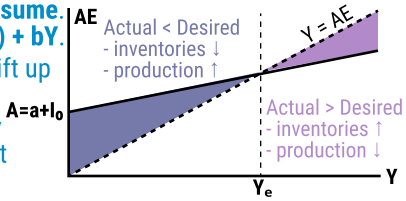
Equilibrium when **AE**xpenditure = **$Y = Y_e$**.

Model everything with an **autonomous part A** and **induced part zY** (**z** is the **marginal propensity to spend**)

$\Delta Y_e/\Delta A$ = **1/(1−z)** is the **simple multiplier**.

Solve to get **Y_e = A/(1−z)**.

Baby Version™
Simplify by ignoring trade and government. Set1 desired investment to a constant **I_0**. Make consumption linear **a+bY** where b is the **marginal propensity to consume**. Then, **AE = (a + I_0) + bY**.



Wealth rises → shift up

Interest rates up → lower inventory → less investment → shift down

Future expectations up → consume more → shift up

Higher sales → higher desired stock → shift up

Taxman Version™
Government can **take** your money, **spend** your money, or give **bonus** money. This is **fiscal policy**. Taking/bonus moneys affect disposable income **YD=Y−T** where net tax revenue **T=T_0+tY** is linear with net tax rate **t** and autonomous taxes **T_0**. Spending money is **G=G_0**. The **budget balance** is **T−G**, positive → surplus and government buys back debt, negative → deficit and go into debt. When zero, budget is balanced. With baby's first tax return,

$$AE = \underbrace{(a + I_0 - bT_0 + G_0)}_{A \text{ (autonomous)}} + \underbrace{b(1-t)}_{z \text{ (induced)}} Y$$

Spending up → shift up, T_0 up → shift down, t up → flatter

Now with more Trade™
Add on net exports **NX = X − IM** with autonomous **exports X** and induced **imports IM = mY** with marginal propensity to import **m**. NX also known as "trade balance". Then,

$$AE = \underbrace{(a + I_0 - bT_0 + G_0 + X_0)}_{A \text{ (autonomous)}} + \underbrace{(b(1-t) - m)}_{z \text{ (induced)}} Y$$

Foreign GDP up → X up → shift up

Domestic price up → X down/m up → down and flatter

CAD weaker → X up/m down → shift up and steeper

National Savings
The sum private + public where private saving is S = Y−C (= I_0 in Baby™) and public is the budget balance T−G.

Essentially the opposite of the consumption function: 1−b is **marginal propensity to save**.

CPI Calculation Example

Given base year (CPI = 100) of 2018, find inflation in 2019 by CPI.

2018	Price	Quant
Good A	$1.10	90
Good B	$1.90	215
Good C	$4.80	90
2019		
Good A	$2.00	130
Good B	$2.20	210
Good C	$9.50	88

Total Expenditure (2018):

$$TE = 1.10(90) + 1.90(215) + 4.80(90) = 939.5$$

Total Expenditure (2019, using 2018s quantities):

$$TE = 2.00(90) + 2.20(215) + 9.50(90) = 1508$$

Calculate CPI for 2019:

$$CPI = \frac{TE_{2019}}{TE_{2018}} \times 100\% = 160.5$$

$$\text{Inflation} = \frac{160.5 - 100}{100} \times 100\% = 60.5\%$$

GDP Deflator Example

2018	Price	Quant
Good A	$1.10	90
Good B	$1.90	215
Good C	$4.80	90
2019		
Good A	$2.00	130
Good B	$2.20	210
Good C	$9.50	88

GDP 2018:

$$GDP = 1.10(90) + 1.90(215) + 4.80(90) = 939.5$$

Real GDP 2019 (using 2018 prices):

$$GDP = 1.10(130) + 1.90(210) + 4.80(88) = 964.4$$

Nominal GDP 2019:

$$GDP = 2.00(130) + 2.20(210) + 9.50(88) = 1558$$

$$\text{Deflator} = \frac{2019_{\text{Nominal}}}{2019_{\text{Real}}} \times 100 = 161.6$$

Exchange Rate Example

The CAD to US dollar exchange rate went from **1.13 to 1.21**. This means CAD has **depreciated** since it takes **more** CAD to buy 1 USD

The CAD to US dollar exchange rate went from **1.27 to 1.13**. This means CAD has **appreciated** since it takes **less** CAD to buy 1 USD

Simple+Trade Model Example

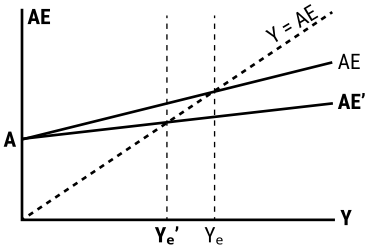
Given the following, find the equlibrium level of expenditure.
(write out the algebra here, everyone does it differently)

C = 50 + 0.75YD
I = 75
G = 75
T = 40 + 0.2Y
X = 60
IM = 0.15Y
Y_e = 418.2

Variable Reference Table

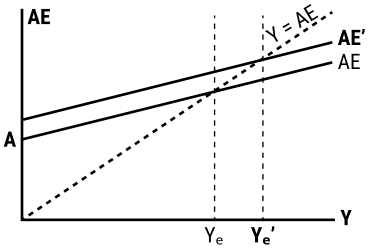
AE = A + zY	**A** | all autonomous expenditures **z** | marginal propensity to spend
z = b(1 – t) – m	**b** | marginal propensity to consume **m** | marginal propensity to import
C = a + b(YD)	**C** | desired consumption **a** | autonomous consumption **YD** | disposable Income
YD = Y – T	**Y** | national income **T** | net revenues
T = T_o + tY	**T_o** | autonomous tax revenues net of transfers **t** | net tax rate of all taxes net of subsidies
NX = X – IM	**NX** | desired net exports **X** | desired exports **IM** | desired imports
IM = mY	**m** | marginal propensity to import
G = G_o **X = X_o** **I = I_o**	For simplicity, all autonomous with no induced **G** | desired government expenditure **X** | exports **I** | autonomous investment expenditure

AE Model Examples



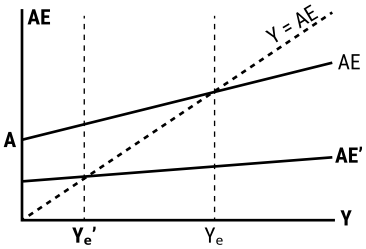
Net tax rate goes up
→ t goes up
→ (1–t) goes down
→ z goes down
→ graph flatter
→ Y_e goes down

Other causes
• MPC goes down
• Imports up

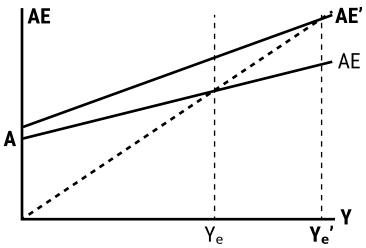


Foreign income up
→ X_0 goes up
→ NX goes up
→ A goes up
→ graph slides up
→ Y_e goes up by $X_0 \times 1/(1-z)$

Other causes
• Wealth goes up
• Future expectations up
• Interest rate down



Relative **foreign** prices go down
→X_0 goes down
→graph slides down
→**also** IM goes up
→m goes up
→graph flatter
→Y_e goes down



Relative **domestic** prices go down
→X_0 goes up
→graph slides up
→**also** IM goes down
→m goes down
→graph steeper
→Y_e goes up

Your Calculations Here

Suggestions: productivity, unemployment rates, business cycle, etc.

ERRATA: Simple multiplier is **ΔY/ΔA**, not the other way around (v1.0)
We described NX curve instead of AE curve at bottom of Trade™ section (v1.0)
$-bT_0$ means tax up → shift down (v1.1)