Department of Economics
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Economics 1, Summer 2003

1) Keynesian Model & Fiscal Policy (20 points)

Suppose an economy is given by C=200+c(Y-T), I_p=50, G= 100, NX=0, T=100, marginal propensity to consume c=0.5. Show your work.

i) (6 points) Given the expression for Planned Aggregate Expenditure and find SR equilibrium output.

$PAE = C + I_p + G + NX$
$= 200 + 0.5(Y-T) + 50 + 100 + 0$
$= 200 + 0.5(Y-100) + 50 + 100 + 0$
$= 200 - 50 + 50 + 100 + 0.5Y$
$= 300 + 0.5Y$

$Y = PAE \Rightarrow$ SR Equil $Y = \frac{1}{1-0.5} \times 300 = 2 \times 300 = 600$

ii) (2 point) Give the algebraic expression for the multiplier and its exact value.

$\frac{1}{1-c}$ $\frac{1}{1-0.5} = \frac{1}{.5} = 2$

iii) (2 points) Give the expression for the output gap. If potential output Y*= 650, what is the exact value of the output gap?

$Gap = Y^* - Y$ $Y^* - Y = 650 - 600 = 50$

iv) (2 points) Does PAE have to increase or decrease to close the gap? By how much?

Increase $50 = 2 \times \Delta PAE = 2 \times 25$ Increase by 25

v) (3 points) Suppose policy makers are considering only a change in G. By how much does G have to change to close the gap?

Increase G by 25

vi) (5 points) Suppose policy makers are considering only a change in T. By how much does T have to change to close the gap?

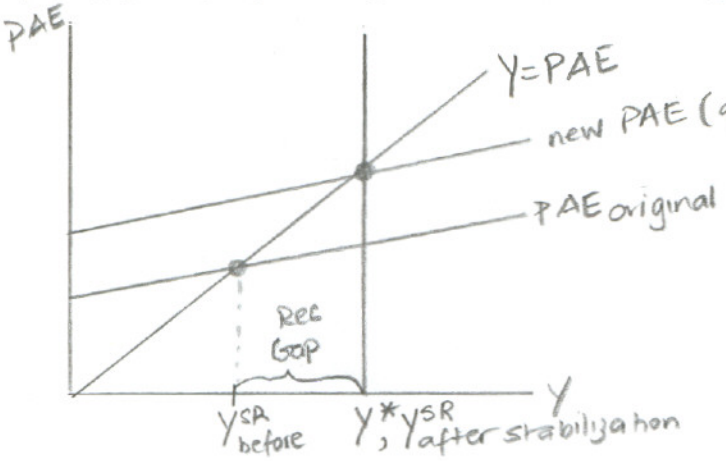
Decrease T $\Delta PAE = 25 = 0.5(\Delta T)$ Decrease T by 50

2) Keynesian Model & Monetary Policy (20 points)

a) Keynesian Cross

In a Keynesian Cross diagram show how monetary policy can be used to remove an output gap. Assume the economy is originally at SR equilibrium output, but with a recessionary output gap.

i) (5 points) Draw the diagram and label axes. 1 for each of 4 correct lines, 1 for axes lab
ii) (6 points) Clearly label original PAE, new PAE, original SR equilibrium output, potential output, gap and new short run equilibrium output after gap is closed. 1 each
iii) (4 points) Explain, in general terms, how a change in real interest rate can close the gap.



(2) A decrease in r can close the rec. output gap by increasing aut PAE (via increase in C and I, assuming each negatively related to r).

b) Monetary Policy to Close Recessionary Gap

Suppose PAE=100-1000r + 0.9Y. Potential output Y* =700. Suppose the recessionary output gap equals 200. Suppose the real interest rate originally equals 5%.

i) (1 point) Give the exact value of the multiplier. $1/1-0.9 = 1/0.1 = 10$
ii) (1 point) By how much does PAE have to change to close the gap? $200 = 10 \times \Delta PAE$, ↑ 20
iii) (3 points) What level of the real interest rate will eliminate the recessionary output gap? Show all your work.

1% inc r ⇒ $1000 \times 0.01 = 10$ drop in PAE (1)
Need PAE to inc by 20, drop r 2 percentage pts to 3% (2)

OR

$700 = 100 - 1000r + 0.9 \times 700$
$1000r = 30$ $r = 0.03$ when gap=0, $Y^* = Y$

3) True/False/Definition/Explain (15 points)

Define the term in bold. State whether statement is true or false. Explain with words, graphs, equations and calculations, as appropriate.

a) (5 points) If the required reserve deposit ratio equals 0.10 and initially currency held by the public is 100 and reserves are 200, then withdrawals by consumers of 100 (so that they can hold 100 more in currency) during the back-to-school shopping season will increase the **money supply (M1)** from 1200 to 2100.

M1 = sum of currency held by public plus checking acct balances (dem. deposits)

Money Supply = Currency + $\frac{\text{Reserves}}{\text{RR ratio}}$

F

Initially, money supply = 100 + 200/0.1 = 2100

Back to school shopping, money supply = 200 + 100/0.1 = 1200

MS falls

b) (5 points) If cyclical unemployment increases by 2.5% and potential output is $100B, then by **Okun's Law**, the output gap will increase by $10B.

F Okun's Law states that with every 1% inc in cyclical unemp. there is 2% increase in output gap, relative to potential

Here ↑ cyclical unemployment = 2.5%, inc output gap = 5% of potential = 5% x 100 B = 5 B.

c) (5 points) A law that requires 2004 minimum wage of $10 to increase to $11 in 2005, when the level of the CPI increased 10% between 2004 and 2005, is an example of **indexing** the minimum wage to inflation.

T Indexing is practice of changing level of nominal quantity by given percentage of change in an index (like CPI).

Wage increase is 10%, $\frac{11-10}{10} = \frac{1}{10} \times 100\% = 10\%$

CPI increased 10%.

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4) Automatic Stabilizer (15 points)

Consider the economy given by $C = \bar{C} + c(Y-T)$, $G = \bar{G}$, $I = \bar{I}$, $NX = \overline{NX}$. Taxes T consist of some constant amount $\bar{T}$ (eg. for gas and other sales taxes) and an income tax that is some fraction t of income Y, so $T = \bar{T} + tY$. Income tax consists of federal (F) and state (S) taxes, so $t = t_F + t_S$. The income tax is an example of an automatic stabilizer and here we assume a single federal and single state tax rate. $(0 < t < 1)$

i) (6 points) Give the expression for the multiplier with and without the stabilizer. Which one is larger?

$$PAE = \bar{C} + c(Y - \bar{T} - tY) + \bar{G} + \bar{I} + \overline{NX}$$
$$= \bar{C} - c\bar{T} + \bar{G} + \bar{I} + \overline{NX} + c(1-t)Y$$
$$Y = PAE \Rightarrow \text{SR Eqm } Y = \frac{1}{1-c(1-t)} \cdot \text{Aut PAE}$$

Almost Exactly Like worked problem lec 10/11 Ch 26, #10

$$\text{Mult w/ Stabilizer} = \frac{1}{1-c(1-t)} = \frac{1}{1-c(1-t_F-t_S)} < \text{Without Stabilizer mult} = 1/1-c$$

ii) (4 points) Explain the purpose of an automatic stabilizer.

Reduce amt of tax when output / income low, Increases DI, increases C (2)
Get most to spending during downturns (2)
Reduces fluctation in output

iii) (5 points) Suppose marginal propensity to consume $c = 0.25$ and federal income tax rate $t_F = 0.15$. What state tax rate t_S would make the multiplier with the stabilizer equal 5/4 (or 1.25)?

$$\frac{1}{1-0.25(1-t)} = \frac{5}{4} = \frac{10}{8} \Rightarrow \frac{1}{1-\frac{1}{4}(1-t)} = \frac{1}{\frac{8}{10}} = \frac{1}{0.8}$$ (2)

$$0.8 = 1 - 0.2 \Rightarrow 1 - t = 0.8 \Rightarrow t = 0.2$$ (2)

$$\Rightarrow t_S = t - t_F = 0.2 - 0.15 = 0.05$$

5) Average Productivity of Labor APL (10 points)

For this question use words, equations, calculations and graphs, as appropriate.

a) (2 points) How does a country's standard of living depend upon APL?

Standard of Living = Real GDP per capita = Y/POP (1)

$Y/POP = Y/N \times N/POP = APL \times \frac{N}{POP}$ (1)

b) (2 points) If in some country APL=100 and percent of population working is 50% in 1990 and in 2003 APL =200 and percent of population working is 50%, what has happened to the standard of living?

1990 $Y/POP = 100 \times 0.5 = 50$

2003 $Y/POP = 200 \times 0.5 = 100$ (1)

Std of living doubled. Increased $\frac{100-50}{50} \times 100\% = 100\%$. (1)

c) (3 points) List 3 determinants of APL.

human capital (others: legal environment, nat res.)

physical capital

technology

d) (3 points) Give an argument and any empirical evidence for why increases in capital may be relatively more effective in increasing living standards for poorer countries (with low levels of capital per worker) than for rich countries (those with high levels of capital per worker).

(1) ↑ K ⇒ ↑ APL

(2) Dim. Ret to capital

(3) Text Evidence on cross country APL vs K/worker

Smaller inc in APL per unit inc in K/worker when K/worker high

(Full Credit for Complete Graph)

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6) Monetary Policy (5 points)

a) (2 points) The FED is secret about its actual decision-making process. Explain how the Taylor Rule predicts FED behavior in setting the target interest rate?

$r = 0.01 - 0.5\left(\frac{Y^* - Y}{Y^*}\right) + 0.5\,\pi$ (2)

OR Taylor rule fcn of Output gap, Inflation (1)

Negatively related to output gap & positively related to inflation (1)

b) (3 points) If there is an expansionary output gap and the FED intervenes with an open market operation, state whether the FED will buy or sell bonds and explain how this affects the money supply and nominal interest rate in this case.

Expansionary Gap ⇒ Open Market Sale

Sell Bonds

Public buys w/ currency / checks written to FED, Money leaves Banks, MS ↓

Sell Bonds ⇒ ↑ Supply of Bonds ⇒ P_{Bonds} ↓ ⇒ r ↑

Correct Money Mkt graph gets 2 pts

7) U.S. Economic History: 2001 Recession (5 points)

The 2001 recession was unusual in that consumption spending remained high despite a dramatic fall in stock market related wealth. Explain the role of the wealth effect and investment spending as possible explanations for the slowdown in economic activity. Be complete, but concise.

Stock Mkt wealth effect ⇒ C falls due to decline in wealth

In fact C stable. Housing P in (opp. wealth effect) and DI rising over period.

Stock Mkt wealth effect does not explain fall in GDP

Firms realize new technologies not productive, reduce investment spending. Main explanation for fall in GDP

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8) National Saving (5 Points)

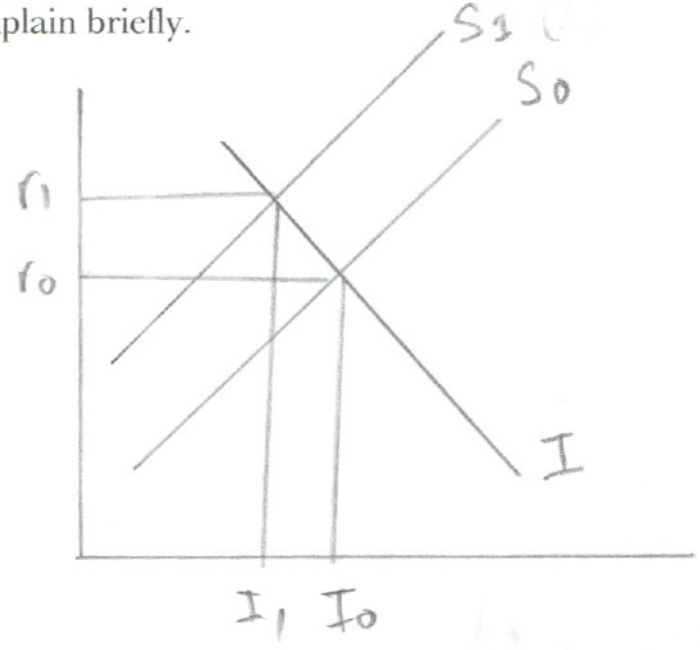
a) (2 points) State or derive the expression for national saving and show how it is the sum of private and public saving.

$$S = Y - C - G$$
$$= Y - C - G + T - T$$
$$= \underbrace{Y - C - T}_{\text{priv saving}} + \underbrace{T - G}_{\text{public saving}}$$

(1)

(1)

(3 points) Using a graph, show the effect of an increase in government deficits, on equilibrium investment and real interest rate in the market for savings funds. Explain briefly.



Equil I falls to I_1
Equil r inc to r_1

S_1 shifts in due to reduced T - G, from increased G - T

Correct shift
correct r, I
Explanation

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9) Stocks & Bonds (5 points)

Suppose you bought a bond with face value $100, with an annual coupon rate (yield) of 5%. (The term of the bond is 2 years. This means that at the end of year 1 bond holder gets $5 and at end of year 2 bond holder gets $100 + $5.)

(i) (2 points) Suppose that at the end of the first year you receive your $5 coupon payment and want to sell this bond. Interest rates in the mean time have fallen to 3%. For how much can you expect to sell this bond? (Use the table below to help with your calculations.)

105/1.02=	102.94
105/1.03=	101.94
105/1.05=	100.00
100/1.02=	98.04
100/1.03=	97.09
100/1.05=	95.24

$\frac{105}{1.03} = 101.94$ (2)

$P_{Bond} \uparrow$

(ii) (3 points) Explain why a rational decision-maker would offer to pay this price for your bond?

Required yield, rate of return, interest rate = 3%
Pay 101.94, get 105 in 1 year means earn 3%
Pay any less & you don't sell (another buyer will pay 101.94)
Buyer won't pay more since other assets, including new bonds give 3% yield.

Extra Credit Questions (5 points)

1) **(2 points) NBER has determined that the 2001 recession had a peak in** 3/01 **and a trough in** 11/01**. (Give month and year)**
2) **(1 point) The unemployment rate is** 6.2 %**.** 6.4% OK too
3) **(1 point) The FED's target Federal Funds rate is** 1%**.**
4) **(1 point) The identity** NX+KI=0 **explains how net capital inflows permit trade deficits (NX<0).**

You're Done! Great Work!