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ECON110-02

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Chapter 8 Problem Set

1. $\frac{(Y_t - Y_{t-1})}{Y_{t-1}} = 0.0081 - 1.83(U_t - U_{t-1}) + e$ (e negligible)

a. If unemployment is constant, $(U_t - U_{t-1}) = 0$

$\frac{(Y_t - Y_{t-1})}{Y_{t-1}} = 0.0081$

$Y_t - Y_{t-1} = 0.0081 Y_{t-1}$

$Y_t = 1.0081 Y_{t-1}$

Output must grow by **0.81%** each quarter to keep unemployment constant.

b. If unemployment decreases by 1%, $U_t - U_{t-1} = -0.01$

$\frac{(Y_t - Y_{t-1})}{Y_{t-1}} = 0.0081 + 0.0183$

$Y_t - Y_{t-1} = 0.0264 Y_{t-1}$

$Y_t = 1.0264 Y_{t-1}$

Output would have to grow by **2.64%** next quarter.

c. $U_{t-1} = 0.097$, $U_t = 0.055$

$Y_t = 4{,}624$ billion

$\frac{(Y_t - 4{,}624)}{4{,}624} = 0.0081 - 1.83(0.055 - 0.097)$

$\frac{(Y_t - 4{,}624)}{4{,}624} = 0.08496$

$Y_t - 4{,}624 = 392.85504$

$\Delta Y = 393$ billion

2. a) monthly inflation = 27.5%

Yearly inflation rate $= (1 + 0.275)^{12} - 1$ **= 1,745% yearly**

During a period of hyperinflation, prices rise by more than 50% per month, or $(1.5)^{12} - 1 = 12{,}875\%$ yearly. Here, prices rise by "only" 27.5% each month and 1,745% each year, so this is not hyperinflation.

b) $i^r = \frac{i - \dot{p}}{1 + \dot{p}}$ $\dot{p}$ = inflation rate, i = nominal inflation rate

$i = 25\%$, $\dot{p} = 1{,}745\%$

$i^r = \frac{0.25 - 17.45}{1 + 17.45} = \frac{-17.2}{18.45}$ **= -93.22 %**

(over)

c) after-tax real interest rate $= i^{rt} = \frac{(1-t)i-\dot{p}}{1+\dot{p}}$

$t=0.3,\ i=0.25,\ \dot{p}=17.45$

$i^{rt} = \frac{0.7(0.25)-17.45}{18.45} = \frac{-17.275}{18.45}$ $\boxed{=-93.63\%}$

d) $0.05 = \frac{0.7i-17.45}{18.45}$

$0.9225 = 0.7i - 17.45$

$0.7i = 18.3725$

$\boxed{i = 2{,}624.64\%}$

3. a) real monthly wage $= \frac{\text{nominal wage}}{\text{CPI}}$ (chart attached)

b) In 1973, privates' real wages were \$734 in '82-'84 dollars and \$1300 in 2001, both of which were the highest for the given years.

$\boxed{1973}$

c) $p_t = p_0(1+\dot{p})^t$

$177.1 = 30.6(1+\dot{p})^{38}$

$5.788 = (1+\dot{p})^{38}$

$1.756 = 38\ln(1+\dot{p})$

$0.0462 = \ln(1+\dot{p})$

$e^{0.0462} = 1.0473 = 1+\dot{p}$

$\boxed{\dot{p} = 4.73\%}$

d) doubling time $= \frac{70}{\dot{p}} = \frac{70}{4.73}$ $\boxed{\approx 14.8 \text{ years}}$

e) ex ante real rate of interest $= i - \hat{\dot{p}}$ $\hat{\dot{p}}$ = expected rate of inflation

$i = 0.1,\ \hat{\dot{p}} = 0.0473$

$i^r = 0.1 - 0.0473 = 0.0527$ $\boxed{=5.27\%}$

Honors option

Question 4* is on the next page; a row with the 2006 data has been added to the chart on the last page (source: *Statistical Abstract of the United States*).

Year	Monthly pay Private E1	Consumer Price Index (1982-84 = 100)	Real Monthly Wage	
			(1982-84 $)	(2001 $)
1963	$78	30.6	$255	$451
1973	$324	44.2	$734	$1,300
1978	$397	65.2	$609	$1,078
1987	$658	113.6	$579	$1,026
1989	$699	123.9	$564	$999
2001	$964	177.1	$544	$963
2006	$1,274	202.9	$628	$1,112

Sources: *Statistical Abstract of the United States* (CPI); goarmy.com (Army pay)

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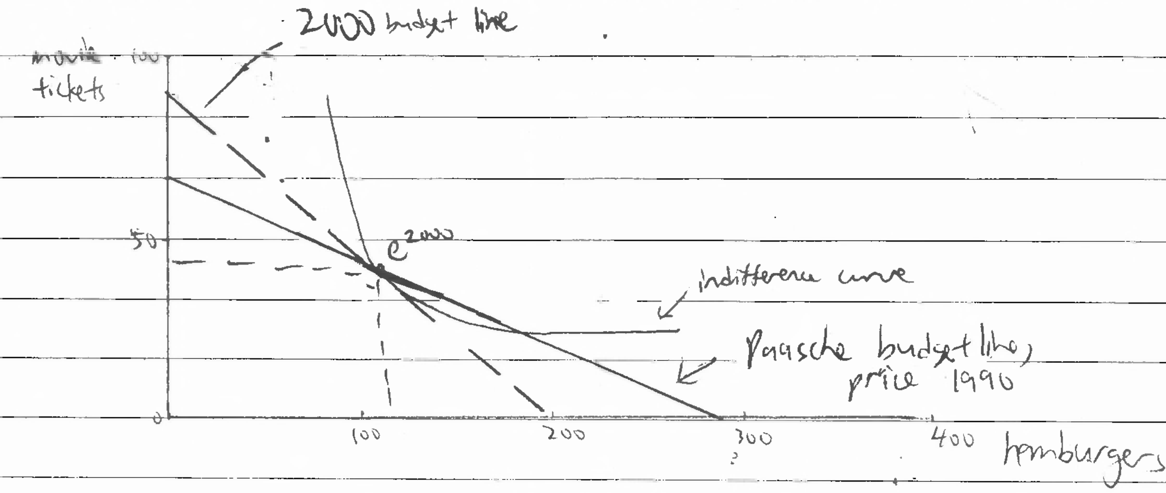

In year 2000 the customer indifference curve is tangent with the 2000 budget line at point e^{2000}.

The Paasche budget line goes through e^{2000}, allowing customer to purchase the same goods at year 1990 prices. But ~~For~~ since Paasche budget line has a different slope as 2000 budget line, it is not tangent to the indifference curve at point e^{2000}.

It is clear from the graph that ~~at~~ a lower budget for year 1990 would have given the same degree of satisfaction as in year 2000. Thus the Paasche index, the ratio of $\frac{\text{year 2000 budget}}{\text{year 1990 budget}}$ tends to <u>understate</u> the amount of inflation, as the denominator is too large.

Great!