

14.02 QUIZ 2, Spring 2012

Time Allowed: 90 minutes

Name (please print):

Recitation time (please circle one): 9am, 10am, 11am, 1pm, 2pm, 3pm

1.Short Questions (7 points each):

Determine whether each of the following statements is True, False or Uncertain. Give a brief explanation for each answer.

- a) **7pts.** In an attempt to keep unemployment rate below its natural rate, many Latin American countries used expansionary fiscal and monetary policies heavily. These policy choices were the main reason why these same countries entered difficult periods of high inflation, from which they struggled to get out.

True. By keeping u below u_n , these countries slowly but firmly changed price expectations, and induced very high levels of inflation. By the time these countries realized they wanted to lower inflation, they had to resort to contractionary policies. Thus, they increased unemployment rate above u_n so as to decrease inflation rate over time until it reached more manageable levels.

- b) **7pts.** If the number of employed workers in a country decreases, the unemployment rate in the country will increase

Uncertain / False. The unemployment rate is defined as $Unemployment / (Employment + Unemployment)$. When the number of employed workers decreases, the number of unemployment may decrease at the same time if there are a large number of people quitting the labor force. If the decrease in the number of unemployment is sufficiently large, the unemployment rate will decrease.

- c) **7pts.** An increase in the duration of unemployment should be linked to a decrease in flows in and out of unemployment, if one is to keep unemployment constant

True. If the duration of unemployment is increasing, it can only be due to people entering unemployment, but not leaving as quickly as they used to (a decreased flow out of unemployment into either employment or out-of-labor-force). Holding every other flow constant, this would immediately increase unemployment. Therefore, if one is to keep unemployment constant, the lower flow out of employment must be accompanied by lower flow into employment.

- d) **7pts.** Workers' reluctance to take nominal pay cuts offers a feasible explanation of why the Phillips Curve relation breaks down when there is deflation.

True. Workers are very likely to accept cuts in real wages that occur when their nominal wages increase more slowly than inflation. However, they are very likely to fight the same cut in real wages if it is done through cutting nominal wages while price level is decreasing more slowly. In these cases, the Phillips Curve relation between the change in inflation and unemployment may disappear when an economy is close to or below zero inflation.

2. "Animal Spirits" (26 points)

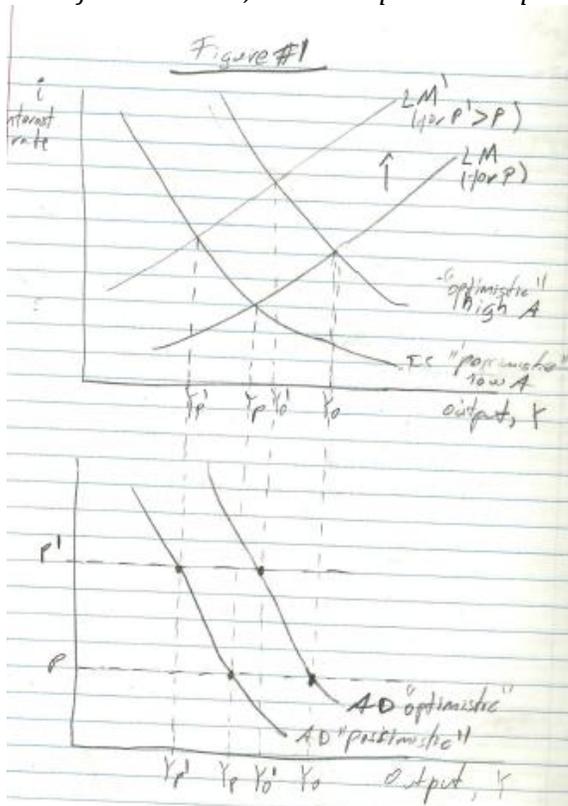
Consider the following quotes on investment demand from *The General Theory of Employment, Interest and Money*, the book written by John Maynard Keynes in 1936:

On Investment, Chapter 12: "[...]most [...] of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits -- of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. Enterprise only pretends to itself to be mainly actuated by the statements in its own prospectus, however candid and sincere [...] if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die [...]"

Let's assume that what Keynes really meant by "animal spirits" was "business confidence". We infer from this that investment, I , not only depends on the interest rate and income, but also (and independently from i and Y) on "business confidence". Given Keynes' quote:

- a) **13 pts.** How does this affect the shape of aggregate demand? Starting from the investment curve and moving to the IS-LM model, graphically derive both an "optimistic AD" (i.e. an AD curve which embeds high business confidence) as well as a "pessimistic AD" (i.e. an AD curve which embeds low business confidence).

In essence, our interpretation of Keynes' quote tells us: $I=I(i,Y,A)$, not just $I=I(i,Y)$, where A stands for Animal Spirits = Business Confidence. For a higher level of A , a higher level I . Therefore, the equilibrium in the goods market (IS relation) would be described by $Y = C(Y-T) + I(i,Y,A) + G$. A "confident/optimistic" market would have a higher level of output for every level of interest rate, when compared to a "pessimistic" market (IS curve shifts).



As such, AD relation is described by $Y=Y(M/P, G, T, A)$, and an “optimistic AD” would have higher output at every price level than a “pessimistic AD”

- b) **13 pts.** If Animal Spirits (business confidence) do play a role in the economy, what do they imply about the potential tools policymakers have at their disposal for affecting output in the short run? Apart from monetary and fiscal policy, propose a new type of policy that could be used for increasing or decreasing output in the short run (be specific).

How can we affect animal spirits, A, is what we are asking here. Any answer that mentions a reasonable tool for impacting business confidence in an economy is a correct answer (but it has to be a specific policy, not just saying “a policy that changes business confidence”).

For example:

- *Being overly optimistic (or pessimistic) about the future through media campaigns or through public announcements.*
- *Lying and manipulating real data, and embellishing/tarnishing it to influence business confidence*
- *Motivational, and inspiring speeches*

Etc, etc.

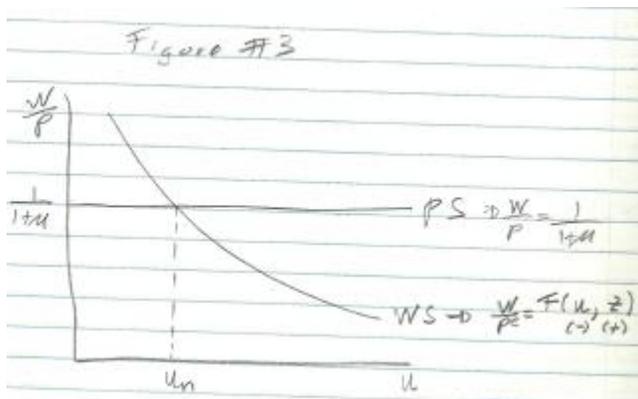
3. “Fire at Will!” (46 points)

- a) **11 pts.** Starting from the wage setting relation and the price setting relation, derive an expression for aggregate supply. Make sure you clearly explain each steps in the derivation.

Wage Setting relation (WS): $W=P^e \cdot F(u, z)$, Wage is a function of expected price level P^e , unemployment rate u , and an all encompassing variable z that captures, among other things, unemployment benefits and factors that affect bargaining power of labor

Price Setting relation (PS): $P=W(1+\mu)$, Price set by firms is a function of wages paid to workers W , types the mark-up $1+\mu$, which we assume fixed.

In the medium run, $P=P^e$, and real wages and natural rate of unemployment are determined by intersection of WS and PS.



Unemployment rate, $u = U/L = (L-N)/L = 1 - (N/L)$, where U is unemployment, L labor force, N employment

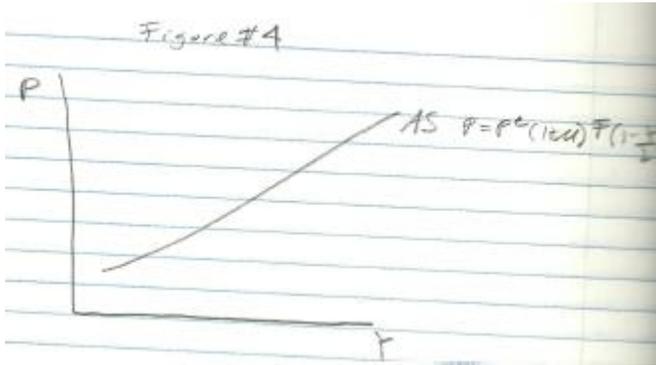
Assume production function $Y = AN$, where A is labor productivity and N is employment

We end up with $u = 1 - Y/L$

$$WS \text{ relation: } W = P^e * F(u, z) = P^e * F(1 - Y/L, z) \quad (1)$$

$$PS \text{ relation: } W = P / (1 + \mu) \quad (2)$$

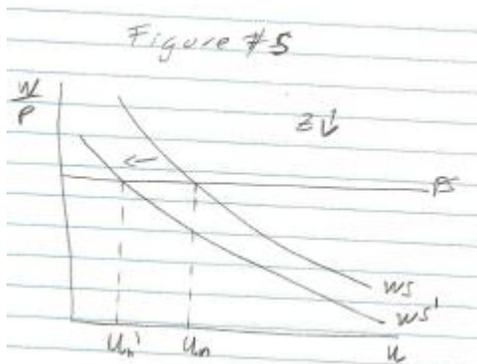
Setting (1)=(2), then AS relation: $P = P^e * (1 + \mu) * F(1 - Y/L, z)$



Italy's Prime Minister, Mario Monti, has introduced to Parliament a proposal that, if approved by the legislature, would change Italy's labor laws. The Italian Executive claims that the new measures would "create a dynamic, flexible and inclusive labor market, one able to [...] create good working conditions [...]".

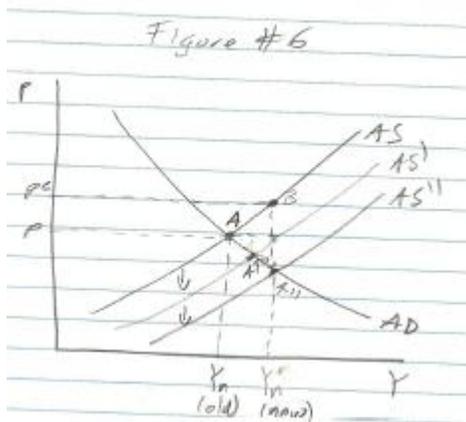
We interpret these proposals as a *decrease in firing and hiring costs, i.e. a decrease in the variable z , the parameter in the wage setting relation.*

- b) **6pts.** Using the wage setting relation and the price setting relation from part a, predict what will happen to the unemployment rate in the medium run if these labor proposals pass.



- c) **6pts.** How will the change predicted in part b affect the AS-AD equilibrium? Show using the AS/AD graph. Let E_0 be the initial medium run equilibrium. Let the first short-run equilibrium the economy transitions to be labeled by E' and the new medium run equilibrium by E'' .

Natural rate of unemployment u_n decreases, which increases natural output Y_n . Therefore, AS will shift right, i) first going from point A to point A' in the short run, and ii) then moving to point A'' in the medium run



At point A, output is below the natural level of output, so we know that price level is lower than the expected price level. This leads wage setters to downward revise their expectations.

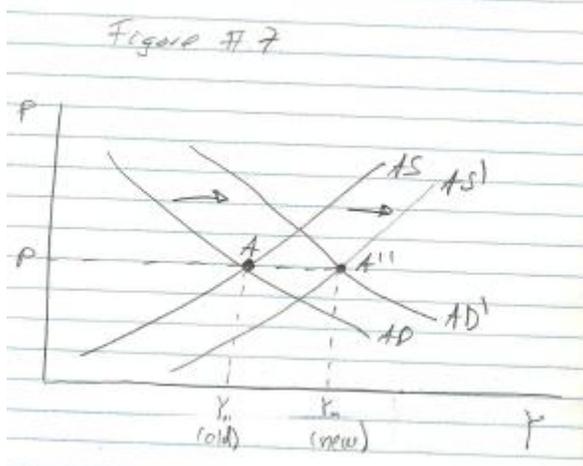
This decrease in expected price level means that Aggregate Supply shifts right from AS to AS', with a new transient equilibrium at A'.

The adjustment doesn't end there. As long as output Y' is below Y_n , price levels will continue to be revised, shifting Aggregate Supply further, until it reaches A'' equilibrium with natural level of output in the medium run.

We now assume that these new labor market measures do pass in Italy's parliament. We also assume that Italy has complete monetary autonomy, and that the objective of the central bank is to maintain a constant price level, $P=P_E$ (note that this is equivalent to a zero inflation target).

- d) **6pts.** What kind of monetary policy should the Bank of Italy choose to achieve its goal? Explain your answer, describe the mechanics through which the economy goes from the initial medium run equilibrium to the new one and use an AS/AD graph to trace the effect of the appropriate policy on the medium run equilibrium.

In order for Price level to remain constant, the Central Bank must anticipate the changes from part d and e. It must implement a policy that counters the downward revision of price expectations. This is done with expansionary monetary policy. With perfect timing and magnitude, the Central Bank induce a smooth transition into a larger output, without affecting price.



Both AS and AD shift to the right, keeping Price level constant and increasing overall output.

Assume that the Italian economy is characterized by the following dynamics::

$$u_t - u_{t-1} = -1/3(g_{yt} - 3\%) \quad (1)$$

$$\pi_t - \pi_{t-1} = -2/3(u_t - 5\%) \quad (2)$$

$$g_{yt} = g_{mt} - \pi_t \quad (3)$$

Assume that the length of transition to the new medium run equilibrium is 1 year, and the absolute value of the change in unemployment needed to implement the Bank of Italy's is $\text{abs}(\Delta u_t) = 1\%$

- e) **11 pts.** What should the nominal money growth rate be in order to achieve a constant price level (i.e. zero inflation)? Show your calculations.

We are targeting change in inflation = 0

In eq. (2), we obtain $u_t = u_n$, so the target unemployment rate must be $u_t = 4\%$

In eq. (1), change in unemployment rate = -1% , yielding a growth rate of output $g_{yt} = 6\%$

In eq. (3), given $g_{yt} = 6\%$, and assumed inflation $\pi_t = 0\%$ (constant price levels), this yields nominal money growth $g_{mt} = 6\%$

- f) **6pts.** Assuming a 2011 base GDP of US\$2.3 Trillion, by how much did output change (US\$ amount)? Will the Italian government increase or decrease its revenues after these measures are implemented? By how much? Assume that the aggregate tax rate is 30%.

*6% of \$2.3 Trillion: $0.06 * 2.3T = \text{US\$138 Billion}$ (roughly the size of the Hungary's entire GDP, at official exchange rate)*

Increase its revenues from, 30% of US\$2.3T to 30% of US\$2.438T = \$41.4B change in government revenues

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