

ECON 102 - Winter 2016
Instructor: François Geerolf

Last Name: _____

First Name: _____

Student ID (UID): _____

Midterm 2
February 17, 2016

Signature: _____

TA Name: _____

Test A

This exam contains 14 pages (including this cover page). The time limit is 75 minutes. You can earn 100 points.

Instructions:

1. Print your Last name, First Name, Student ID Number, Signature, and TA Name (Flavien Moreau, Giovanni Nicolo, Santiago Justel, or Shuo Liu) at the top right-hand corner of this page.
2. The only items that should be on your desk are pencils and/or pens, a **Scantron 882-E**, and the calculator **Canon LS-100TS**, described in the syllabus. NO other items are allowed. Place any other item ON THE STAGE.
3. Once the exam begins, you are not allowed to leave the room until you hand in your exam.

Good luck. Budget your time wisely. (skip the question or even the exercise if you get stuck)

Grade Table (FOR TEACHER USE ONLY)

Question	Points	Score
A	50	
B	50	
Total:	100	

Multiple Choice (50 points)

- A. (50 points) There are 25 **multiple choice** questions. **Multiple responses may be correct, and at least one response is correct. Use your scantron (Results not reported on the scantron will not be taken into account).** You get either 0 or 2 points: if multiple answers are correct you get points only if you have them all ticked.

Miscellaneous

- (1) (2 points) If P_t is the price level at time t , then inflation at time $t + 1$ is given by:
- A. $1/P_{t+1}$
 - B. $P_{t+1}/P_t - 1$
 - C. $P_{t+1} - P_t$
 - D. P_t/P_{t+1}
 - E. $(P_{t+1} - P_t)/P_t$
-
- (2) (2 points) Consider the consumption function $C_t/\bar{Y}_t = \bar{a}_c + \bar{x}\tilde{Y}_t$. If $\bar{x} = 0.9$, a 1 percent positive demand shock:
- A. raises short-run output by 0.9 percent
 - B. raises short-run output by 9 percent
 - C. raises short-run output by 1 percent
 - D. raises short-run output by 10 percent
 - E. has no impact on short-run output
-
- (3) (2 points) With adaptive expectations, the Phillips curve can be written as:
- A. $\Delta\pi_t = \bar{\nu}\tilde{Y}_t + \bar{o}$
 - B. $\Delta\pi_t = \pi_{t-1} + \bar{n}u\tilde{Y}_t$
 - C. $\pi_t = \pi_{t-1} + \bar{\nu}\tilde{Y}_t + \bar{o}$
 - D. $\Delta\pi_t = \bar{\nu}u_t$
 - E. $\pi_t = \pi_{t-1}$
-
- (4) (2 points) Which of the following best describes why the aggregate demand curve slopes downward ?
- A. If the central bank observes a low rate of inflation, the monetary policy rule dictates an increase in the real interest rate. The high interest rate reduces output by reducing investment demand in the economy.
 - B. If the central bank observes a high rate of inflation, the monetary policy rule dictates a decrease in the real interest rate. The low interest rate increases output by reducing investment demand in the economy.

- C. If the central bank observes a low rate of inflation, the monetary policy rule dictates a decrease in the real interest rate. The low interest rate reduces output by reducing investment demand in the economy.
- D. If the central bank observes a high rate of inflation, the monetary policy rule dictates an increase in the real interest rate. The high interest rate reduces output by reducing investment demand in the economy.
- E. None of these answers is correct.
-
- (5) (2 points) According to the Fisher equation, if the nominal interest rate is 2% and there is 2% expected deflation, then the expected real interest rate is:
- A. 0%
 - B. 1%
 - C. 2%
 - D. 4%
 - E. None of the above.
-
- (6) (2 points) Assume that investment responds to interest rates in such a way that $\bar{b} = 0.5$. If \bar{a} rises by 2% and the real interest rate falls by 2%, short-run output:
- A. falls by 2 percent
 - B. rises by 1 percent
 - C. rises by 3 percent
 - D. falls by 1 percent
 - E. does not change
-
- (7) (2 points) If $\bar{m} = 5$, how much does inflation need to be above target to justify raising interest rates above the marginal product of capital by 0.5%?
- A. 0.1%
 - B. 0.2%
 - C. 0.25%
 - D. 2.5%
 - E. 5%
-
- (8) (2 points) The (AD) curve can be seen as:
- A. A combination of the (IS) curve and the Phillips curve.
 - B. A combination of the (IS) curve and the (LM) curve.
 - C. A combination of the demand curve for labor and the demand curve for investment.
 - D. A combination of the (AS) curve and the monetary policy rule.
 - E. A combination of the (IS) curve and the monetary policy rule.

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- (9) (2 points) What was per capita GDP growth in the United States over 1870-2012?
- A. 1%
 - B. 2%
 - C. 3%
 - D. 4%
 - E. 5%
-
- (10) (2 points) What was GDP growth in the United States over 1870-2012?
- A. 2%
 - B. 3%
 - C. 3.5%
 - D. 4.5%
 - E. 5.5%
-
- (11) (2 points) What happens if there is a boom in China, which leads China to import more goods from the US?
- A. This does not change anything for the US.
 - B. The US faces an positive aggregate demand shock.
 - C. The US faces a negative aggregate demand shock.
 - D. The (IS) curve shifts right.
 - E. The (AD) curve shifts right.
-
- (12) (2 points) What happens in the (AS)/(AD) framework if investment starts to respond more to interest rate changes?
- A. \bar{m} increases.
 - B. \bar{b} increases.
 - C. The (AS) curve steepens.
 - D. The (AD) curve flattens.
 - E. The (AD) curve steepens.
-
- (13) (2 points) Assume that firms start increasing their prices more when they are faced with a higher demand from consumers. What happens?
- A. The (AD) curve shifts right.
 - B. The (AD) curve steepens.
 - C. The (AD) curve flattens.
 - D. The (AS) curve flattens.
 - E. The (AS) curve steepens.

- (14) (2 points) Assume that the central bank decides to raise its inflation target from 2% to 4%. What happens to the (AD) curve?
- A. The (AD) curve does not move.
 - B. The (AD) curve steepens.
 - C. The (AD) curve flattens.
 - D. The (AD) curve shifts right.
 - E. The (AD) curve shifts left.
-

- (15) (2 points) Assume that the central bank decides to raise its inflation target from 2% to 4%, and that people have adaptive expectations. What happens to inflation and why?
- A. Inflation rises because the central bank said so.
 - B. Inflation rises because the central bank is now responding less to deviations of inflation from the target inflation.
 - C. Inflation rises because the central bank now sets a lower interest rate for a given level of inflation.
 - D. Inflation decreases because aggregate demand is too low at this level of inflation.
 - E. Inflation decreases because of sticky expectations.
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- (16) (2 points) Assume that your first salary coming out of UCLA is \$63,000, that your boss gives you a promotion every year of 2%. Assuming that the interest rate is 6%, how much would your human capital be worth if you were able to live forever?
- A. \$1,169,500.
 - B. \$1,669,500.
 - C. \$2,169,500.
 - D. \$2,669,500.
 - E. \$3,169,500.
-

- (17) (2 points) Assume that your first salary coming out of UCLA is \$63,000, that your boss gives you a promotion every year of 2%. Assuming that the interest rate is 3%, how much would your human capital be worth if you were able to live forever?
- A. \$2,489,000.
 - B. \$3,489,000.
 - C. \$4,489,000.
 - D. \$5,489,000.
 - E. \$6,489,000.
-

Effects of Leverage

Consider the following balance sheets for three hypothetical financial institutions, bank A, bank B and bank C. You will need to fill in the missing entries in the balance sheets (denoted ___) to answer the following multiple choice questions.

Bank A's Balance Sheet			
Assets		Liabilities	
Cash	600	Deposits	1400
Loan to bank B	500		
Mortgage-Backed Securities	400		
Total assets	___	Total Liabilities	___
		Equity (net worth)	___

Bank B's Balance Sheet			
Assets		Liabilities	
Cash	1000	Deposits	900
Loan to bank C	500	Loan from Bank A	500
Total assets	___	Total Liabilities	___
		Equity (net worth)	___

Bank C's Balance Sheet			
Assets		Liabilities	
Mortgage-Backed Securities	800	Deposits	200
		Loan from Bank B	500
Total assets	___	Total liabilities	___
		Equity (net worth)	___

(18) (2 points) What is the leverage ratio in Bank A?

- A. 1/7
- B. 1/14
- C. 7/1
- D. 14/1
- E. 8/1.

(19) (2 points) What is the leverage ratio in Bank C?

- A. 1/7
- B. 1/14
- C. 7/1
- D. 14/1
- E. 1/8.

- (20) (2 points) Suppose housing prices fall sharply and the mortgage-backed securities as a consequence fall in value by 50%. Assume that banks first make good on their deposits, before actually repaying other banks. Calculate bank A's new net worth.
- A. -250.
 - B. -300.
 - C. -350.
 - D. -400.
 - E. -450.
-

Bathtub Model

In subsequent multiple choice questions, we consider the following "bathtub" model of unemployment. There is a number \bar{L} of people in the labor force. Jobs separate at a rate \bar{s} , and the rate at which unemployed people find new jobs is \bar{f} . Finally, the number of people unemployed is denoted by U_t and the number of people employed as E_t . The unemployment rate is denoted by u_t .

(21) (2 points) Which equality (equalities) is (are) verified in this model?

- A. $U_{t+1} = \bar{f}U_t - \bar{s}E_t$.
- B. $\Delta U_{t+1} = \bar{f}U_t - \bar{s}E_t$.
- C. $\Delta U_{t+1} = \bar{s}E_t - \bar{f}U_t$.
- D. $U_{t+1} - U_t = \bar{f}U_t - \bar{s}E_t$.
- E. $U_{t+1} - U_t = \bar{f}U_t - \bar{s}E_t$.

(22) (2 points) What is the value of the long-run unemployment rate in this model?

- A. $u^* = \frac{\bar{s}}{\bar{s} + \bar{f}}$.
- B. $u^* = \frac{\bar{s}\bar{L}}{\bar{s} + \bar{f}}$.
- C. $u^* = \frac{\bar{f}}{\bar{s} + \bar{f}}$.
- D. $u^* = \frac{\bar{f}\bar{L}}{\bar{s} + \bar{f}}$.
- E. None of the above.

(23) (2 points) Assume that the separation rate is 3%, that the finding rate is 50%, and that unemployment rate is at time 0 equal to $u_0 = 12\%$. What is the long-run unemployment rate?

- A. 3%.
- B. 3.33%.
- C. 5%.
- D. 5.66%
- E. 7%.

(24) (2 points) Assume that the separation rate is 3%, that the finding rate is 50%, and that unemployment rate is at time 0 equal to $u_0 = 12\%$. What is the unemployment rate at time 1?

- A. 6%.
- B. 6.03%.

- C. 8.64%.
 - D. 9%.
 - E. 11%.
-

(25) (2 points) Assume that the separation rate is 3%, that the finding rate is 50%, and that unemployment rate is at time 0 equal to $u_0 = 12\%$. What is the unemployment rate at time 2?

- A. 5.06%.
 - B. 6%.
 - C. 6.06%.
 - D. 7.06%.
 - E. 8%.
-

An Oil Price Shock in the AS/AD Model (50 points)

- B. (50 points) Take the usual AS/AD model, ruling out Aggregate Demand shocks, so with $\bar{a} = 0$, but assuming a one-time, unexpected oil price shock $\bar{o}_0 > 0$. One time means that the oil price shock lasts only for one period, in period $t = 0$, and that $\bar{o}_t = 0$ for all subsequent $t \in \{1, 2, \dots\}$. Unexpected means that the economy was originally in steady-state, and in particular that $\pi_0 = \bar{\pi}$. Unless otherwise noted, agents have adaptive expectations about inflation. The economy is described by an AS/AD model. In particular, the AS curve is given by (be careful about the convention on the timing of the oil shock \bar{o}_{t-1} !):

$$\pi_t = \pi_t^e + \bar{v}\tilde{Y}_t + \bar{o}_{t-1}.$$

The AD curve is the standard one used throughout the course.

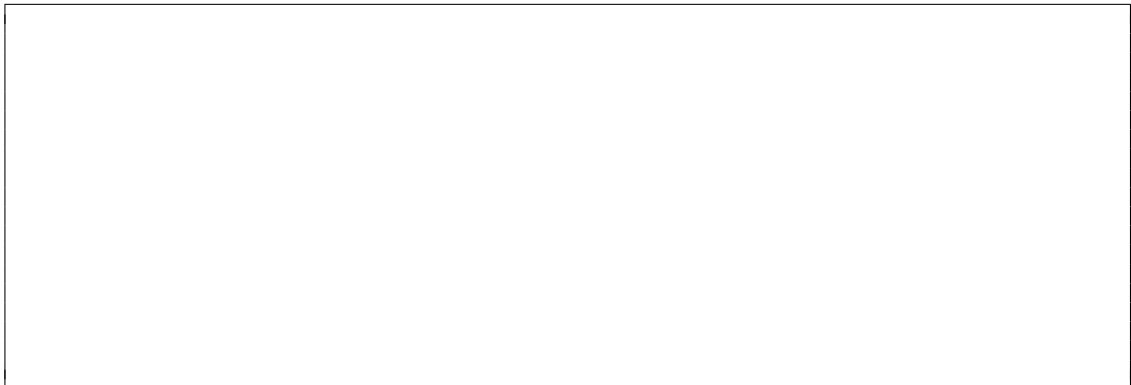
- (1) (5 points) What are the values of π_1 and \tilde{Y}_1 in terms of the parameters of the model? (in particular the size of the oil price shock, \bar{o}_0)

- (2) (5 points) Show in mathematical terms the effect of a more aggressive monetary policy on inflation and short-run output in period 1: do inflation and short-run output increase or decrease with a more aggressive monetary policy?

- (3) (5 points) Illustrate this on two graphs with the AS/AD curves: show one AS/AD diagram with a soft monetary policy, and next to it another AS/AD diagram with an aggressive monetary policy. Show π_1 and \tilde{Y}_1 as well as the long run values of inflation and short-run output on these graphs.

Two empty rectangular boxes intended for drawing AS/AD diagrams. The first diagram should illustrate a soft monetary policy, and the second should illustrate an aggressive monetary policy. Both diagrams should show the AS curve, the AD curve, and the resulting equilibrium output \tilde{Y}_1 and inflation π_1 .

- (4) (5 points) What are the values of \tilde{Y}_1 and π_1 when the central bank does not respond at all to changes in inflation?

A large empty rectangular box intended for the student's answer to question 4.

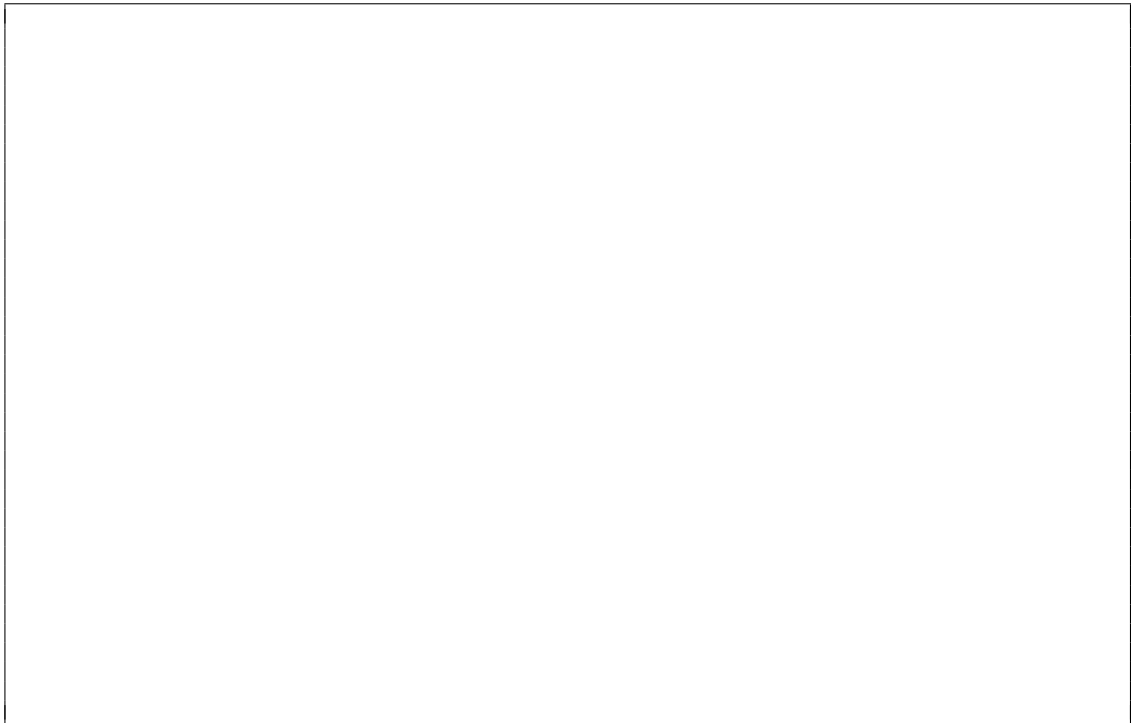
- (5) (5 points) What are the values of \tilde{Y}_1 and π_1 when the central bank responds with a parameter $\bar{m} = +\infty$ in the monetary policy rule?

A large empty rectangular box intended for the student's answer to question 5.

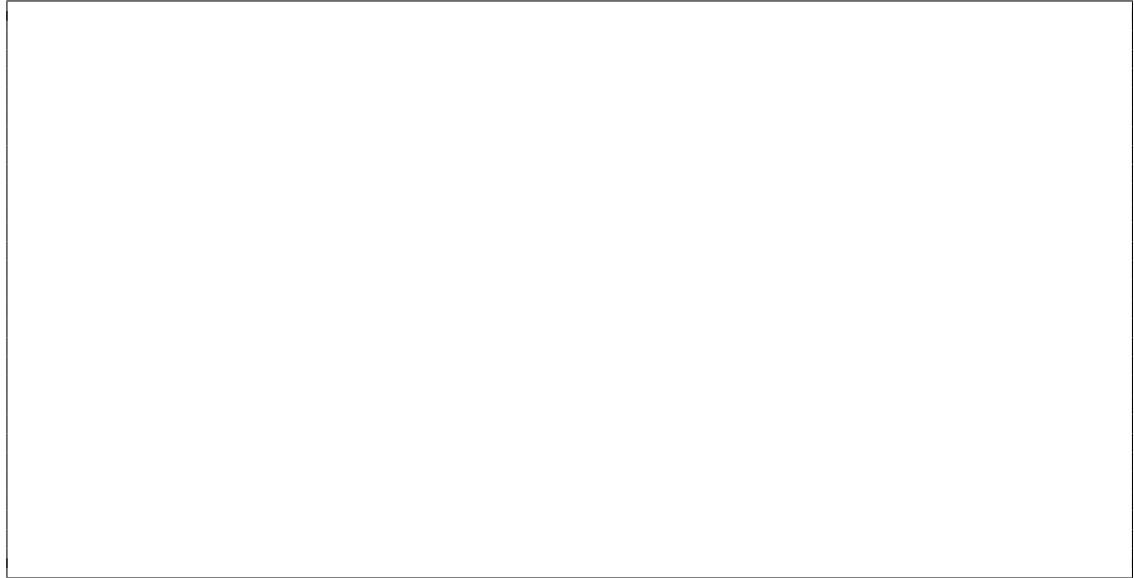
- (6) (5 points) What is the intuition behind the result in the previous question?



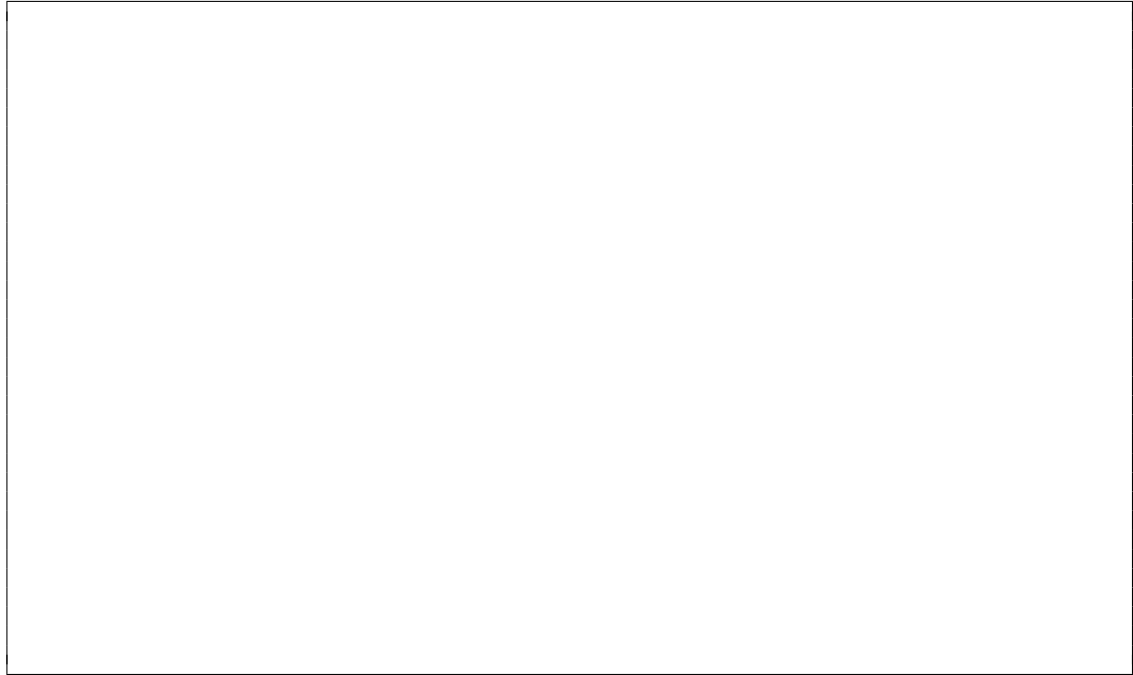
- (7) (5 points) Eliminating \tilde{Y}_t from the AS/AD model, find a difference equation for π_t , for $t \in \{2, 3, \dots\}$.



- (8) (5 points) Subtracting $\bar{\pi}$ on both sides in the difference equation for π_t , show that $\pi_t - \bar{\pi}$ satisfies a simpler difference equation than π_t . Solve for this difference equation. This should give you an expression for π_t as a function of π_1 . Then replace π_1 with the value found in question (1), to get π_t as a function of time and the parameters of the model.



- (9) (5 points) Use the (AD) curve to then calculate \tilde{Y}_t as a function of time and the parameters of the model.



- (10) (5 points) Numerical Application: Suppose the parameters of the (AS) and (AD) curves take the following values: $\bar{o}_0 = 8\%$, $\bar{a} = 0$, $\bar{b} = 2$, $\bar{m} = 2$, $\bar{v} = 1$, and $\bar{\pi} = 4\%$. Solve for the value of short-run output and the inflation rate for the first 2 years after the shock. (**give an approximation**)

