

Brigham Young University Department of Economics
Economics 381 – Intermediate Macroeconomics
Dr. Phillips (sections 2 & 4) Winter Semester 2004

Midterm Exam 1 key
Feb. 4 - 5, 2004

This exam is closed book and closed notes, though you may use a calculator. Read all questions carefully before answering. Write your answers legibly in the space provided. Keep your answers concise and correct. Points will be deducted for answers which are irrelevant to the question. You may use a testing center calculator to help with the math, if you wish.

Section I (multiple choice, 2 points each) Circle the letter of the correct answer.

1. The fact that the unemployment rate is higher after 1970 is primarily explained by
 - (a) changes in the level of economic activity
 - (b) changes in the structure of the population.**
 - (c) changes in government intervention.
 - (d) changes in technology.

2. Approaches to measuring GDP include all of the following **except** the
 - (a) cost approach.**
 - (b) product or value-added approach.
 - (c) income approach.
 - (d) expenditure approach.

3. Suppose that the government collects \$3 million in taxes, pays \$2 million in Social Security benefits, pays \$0.5 million in interest on the national debt, and pays workers \$1 million to sit at their desks and work as little as possible. The government's contribution to GDP is
 - (a) \$0.
 - (b) \$1 million.**
 - (c) \$3 million.
 - (d) \$3.5 million.

4. Discouraged workers are
 - (a) those who have given up looking for work, even though they would like to be employed.**
 - (b) those who quit working because they are dissatisfied with their jobs.
 - (c) those who unmotivated workers who bring down a country's productivity.
 - (d) would like to find a second job to supplement their income, but have not yet found one.

5. Before 2000, the three most recent U.S. recessions occurred in
 - (a) 1969–1973, 1979–1982, and 1994–1995.
 - (b) 1973–1975, 1982–1985, and 1990–1991.
 - (c) 1973–1975, 1981–1982, and 1990–1991.**
 - (d) 1981–1982, 1990–1991, and 1998–1999.

6. If deviations from trend in a macroeconomic variable are negatively correlated with deviations from trend in real GDP, that variable is said to be
- (a) useless in predicting future movements in real GDP.
 - (b) procyclical.
 - (c) **countercyclical.**
 - (d) acyclical.
7. For the period 1948–2003, employment in the United States was
- (a) procyclical and leading.
 - (b) **procyclical and lagging.**
 - (c) countercyclical and leading.
 - (d) countercyclical and lagging.
8. We assume that the representative consumer's preferences exhibit the properties that
- (a) more is preferred to less, up to a satiation point.
 - (b) more is always preferred to less and that each consumer has one strictly favorite good.
 - (c) each consumer has one strictly preferred good and that consumption and leisure are both normal goods.
 - (d) **that consumption and leisure are both normal goods and that the consumer likes diversity in his or her consumption bundle.**
9. The vertical intercept of the consumer's budget line is equal to
- (a) $h + \frac{(\pi - T)}{w}$.
 - (b) $wh + \pi - T$. ←←←←←←←←
 - (c) $c + w(l - h)$.
 - (d) $\pi - T$.
10. As the quantity of labor increases, the marginal product of labor
- (a) is constant.
 - (b) increases.
 - (c) **decreases.**
 - (d) may either increase or decrease.
11. The first fundamental theorem of welfare economics states that
- (a) **under certain conditions, a competitive equilibrium is Pareto optimal.**
 - (b) a competitive equilibrium is always Pareto optimal.
 - (c) under certain conditions, a Pareto optimum is a competitive equilibrium.
 - (d) a Pareto optimum is always a competitive equilibrium.

12. An increase in government spending shifts the PPF
- (a) upward, but does not change its slope.
 - (b) upward, and also changes its slope.
 - (c) **downward, but does not change its slope.**
 - (d) downward, and also changes its slope.
13. An increase in total factor productivity shifts the PPF
- (a) upward, but does not change its slope.
 - (b) **upward, and also changes its slope.**
 - (c) downward, but does not change its slope.
 - (d) downward, and also changes its slope.
14. There is evidence that income per worker is converging in
- (a) the richest countries and the poorest countries.
 - (b) **the richest countries but not the poorest countries.**
 - (c) the poorest countries but not the richest countries.
 - (d) neither the richest nor the poorest countries.
15. The biggest contribution to real GDP growth in the 'East Asian Tigers' during the period 1966–1991 was due to growth in
- (a) total factor productivity.
 - (b) **the capital stock.**
 - (c) the labor force.
 - (d) international trade.

Section II (short answer, 5 points each) Where appropriate show your work as this may help in assigning partial credit if you get the answer wrong.

16. Use the following information to calculate nominal and real GDP. Report these numbers AND the inflation rate as measured by the percentage change in the GDP deflator. (Use 2003 as the base year, do NOT use the chain-index for this problem)

Year	Quantities		Prices	
	Guns	Butter	Guns	Butter
2003	40 crates	70 tons	\$5000 / crate	\$ 1000 / ton
2004	35 crates	100 tons	\$5500 / crate	\$ 1500 / ton

Nominal GDP in 2003 = $40 \times 5000 + 70 \times 1000 = 270,000$

Nominal GDP in 2004 = $35 \times 5500 + 100 \times 1500 = 342,500$

Real GDP in 2003 = 270,000 by definition of the base year

Real GDP in 2004 = $35 \times 5000 + 100 \times 1000 = 270,500$

GDP deflator in 2003 = 100 by definition of base year

GDP deflator in 2004 = $100 \times 342,500 / 270,500 = 124.5$

Inflation Rate in 2004 = 24.5%

17. Recall the discussion of volatility and cyclicity from the textbook and homework #3. Rank the following macroeconomic measures according to their volatility (1 being the least volatile and 4 being the most volatile) and indicate if they are procyclical, countercyclical or acyclical.

	Rank	Cyclicity
GDP	2	
Consumption of Services	1	procyclical
Consumption of Durable	3	procyclical
Investment	4	procyclical

18. Suppose we wish to compare the overall productivity of two countries, Zalchistan & Beluga. Given the information below, what can we say about the relative levels of total factor productivity?

	Zalchistan	Beluga
Real GDP	\$500 billion	\$550 billion
Real Capital	\$1,500 billion	\$1,400 billion
Labor Force	40 million	38 million
Hours per worker	44 hours / week	44 hours / week

Percentage difference in:

Real GDP = 10%, Real Capital = -6.7%, Labor = -5%

Percentage difference in TFP = 10% - .33*(-6.7%) - .67*(-5%) = 15.6%

TFP in Beluga is 15.6% higher than TFP in Zalchistan

19. Recall our simple static model of the economy. Write down the household's budget constraint. Explain each of the terms and how the constraint is derived.

$$C = w(h - \ell) + \pi - T$$

C is consumption, w is the real wage rate, h is the endowment of time, ℓ is leisure time, π is income from non-labor sources and T is lump-sum taxes.

Consumption is labor income (wages times non-leisure hours) and non-labor income minus taxes.

20. What is the convergence hypothesis? Discuss the evidence on convergence.

Notion that output per capita should converge to a common value for all countries. Even if it grows over time, eventually all countries will have the same value.

There is some evidence that incomes per capita have converged for richer countries over the past several decades, but no evidence to support convergence across poorer countries.

21. Name three key differences in assumptions between the Malthusian model and the Solow growth model.

1. The Malthusian model assumes land and labor are the two factors, while Solow assumes capital and labor.

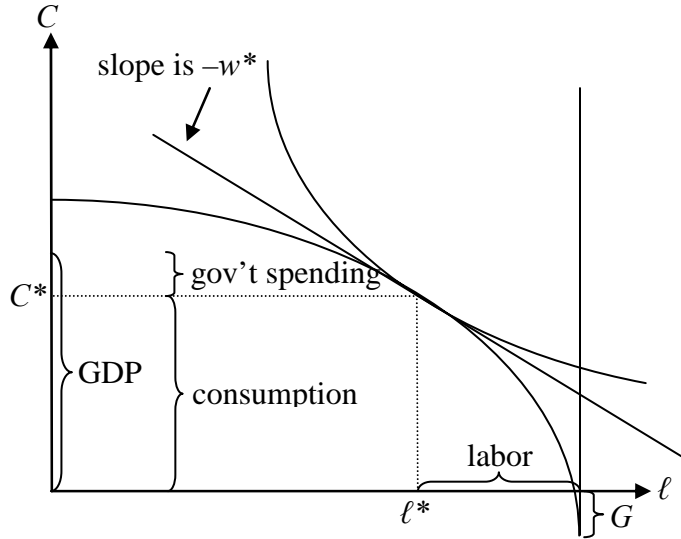
2. Malthus assumes labor growth responds to the level of consumption per capita, Solow assumes it is constant.

3. Malthus assumes land is constant, Solow does not even consider land as a factor

4. Malthus ignores capital, Solow assumes it is built up slowly over time

Section III (longer analysis, 20 points each)

22. Explain the basic set-up for our simple static model of the macroeconomy. Using the appropriate graph, illustrate the equilibrium levels of output, consumption, government spending, labor, leisure and the wage rate.



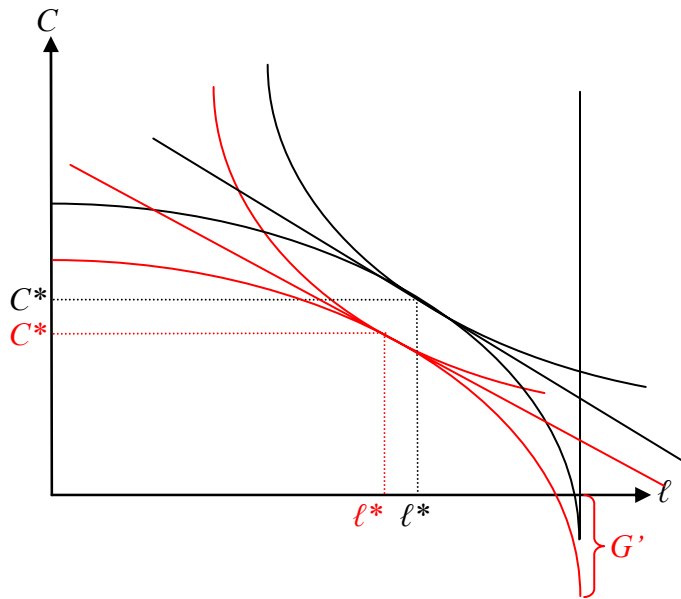
Consumers are endowed with h units of time which they can use as leisure or labor. Leisure generates utility, labor is used to produce consumption goods that also generate utility. The government takes G units per household.

The social planner takes a fixed stock of capital and matches it up with labor to produce the level of output that maximizes average household utility.

This is illustrated by a tangency of the PPF and the indifference curve in the graph to the left.

The wage rate is the slope of these curves at the tangency point.

Now suppose that the economy had a higher level of government spending. Illustrate the differences this would cause.



The increase in government spending shifts the PPF down in a parallel fashion. The new tangency will have a flatter slope, meaning wages are lower. Consumption falls, leisure also falls, and hence labor supply rises. Output rises with labor.

(Leisure unambiguously falls because of the *parallel* shift of the PPF.)

23. State the four main assumptions of the Solow growth model, either using equations and an explanation or using an explanation only.

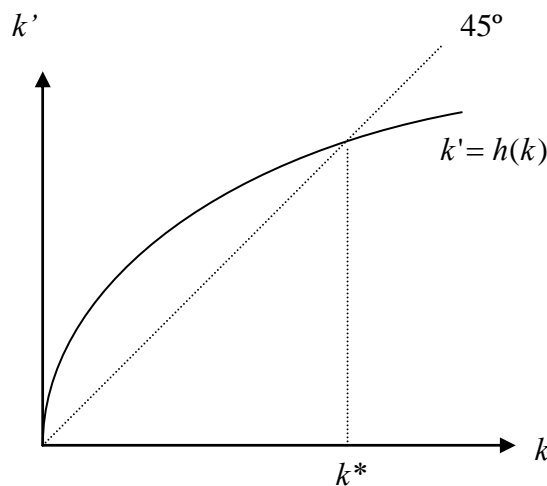
$Y = zF(K, L)$ **output is produced using CRS technology in capital and labor**

$K' = (1 - d)K + I$ **capital accumulates over time with depreciation**

$N' = (1 + n)N$ **labor grows at an exogenous rate, n**

$I = sY$ **investment in new capital is a constant fraction, s , of GDP**

Using an appropriate graph illustrate the steady state for the economy and explain why it is a steady state.

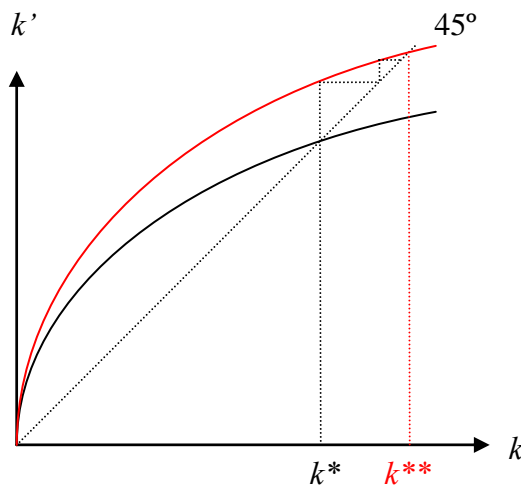


Solving the above yields a transition equation:

$$k' = \frac{1-d}{1+n}k + \frac{s}{1+n}f(k) \equiv h(k)$$

k^* is the value that solves $k^* = h(k^*)$, that is that generates the same value for k next period as k as this period. Hence, the economy is in a steady state.

Now suppose that the level of technology (z) suddenly increased. Illustrate using the same graph how the economy responds over time. Does it converge to a new steady state? If so compare the new and old steady states.



Starting off at the old steady state value of k^* , the economy will generate a higher value of k the period after technology rises.

Over time the value of k rises until it reaches a new, higher steady-state value of k^{**} .