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Fulbright Economics Teaching Program
Academic year 2005-2006

Macroeconomics

Course Syllabus

Fulbright Economics Teaching Program

MACROECONOMICS

Fall 2005

September 05 - October 28, 2005

Teaching Team

Instructor: Thai Van Can

Co-instructor: Truong Quang Hung, Chau Van Thanh

Tutor: Nguyen Hoai Bao

Translator/Interpreter: Nguyen Quy Tam

Class Meeting Times

Tuesday and Thursday: 8:30-11:00.

Friday: 15:15-16:45.

Office Hours

	Monday	Tuesday	Wednesday	Thursday	Friday	
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Thai-Van-Can		11:30-12:30		11:30-12:30	
Truong Quang Hung					
Chau Van Thanh	16:30-18:00		16:30-18:00		
Nguyen Hoai Bao					

Other times by appointment.

Course objectives

The course aims at the acquisition of analytical skills and operational capability for improving the analysis of macroeconomic issues as well as the assessment and formulation of macroeconomic policies. This objective is to be achieved through intensive training in macroeconomic reasoning that is critically applied to real-world macroeconomic issues.

Course Description

The course analyses fluctuations and growth in the economy a whole. To study economic fluctuations, it resorts to a basic four sector model, providing consistent linkages between objectives and policy instruments and other aggregates. The real sector examines the determination of national accounts aggregates, notably, GDP, employment, inflation, and other aggregates, and the aggregate demand and aggregate supply. The fiscal sector analyses fiscal policy, including policies for revenue, expenditure, financing and indebtedness. The monetary sector discusses direct and indirect monetary control instruments to influence liquidity; and the external sector analyses trade, external debt, and exchange rate policies. The model is used to

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1

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Fulbright Economics Teaching Program
Academic year 2005-2006

Macroeconomics

Course Syllabus

simulate the impacts of those policies on main economic aggregates, in an economy-wide context. The course then examines the determinants of economic growth, including structural policy measures. The macroeconomic principles in the course are illustrated by real world experience.

The course also includes reviews, problem sets, and case studies.

Student Obligations: Grades, Problem Sets, and Related Matters

Students are expected to attend class regularly, read the required readings carefully prior to class meeting, actively participate in class discussions, and complete written assignment as scheduled.

Grading

Grades for the course will be based on the following weights:

Problem sets 30%
Midterm Examination 35%
Final Examination 35%

Problem Sets

Problem sets will be assigned .They should be submitted by 8:20 a.m. [the](#)
[on the due date for](#) [office](#) . **The purpose of these problem sets is to enable a deeper**
understanding of the material covered in lectures and assigned textbook readings, with questions
and exercises related to real-world issues. Students are encouraged to work in groups, but they
must write and submit their own individual answers.

Related Matters

To maximize the benefits from the course, students are encouraged to work in groups . At the
beginning of each class, each group will orally provide any questions on the required readings
that are unresolved within the group.

Course Textbooks, Reference Textbooks, and Readings and Other References

Specific core reading assignments are indicated in the course schedule.

Other sources may be assigned as needed.

Course Textbooks

N.G. Mankiw, *Macroeconomics*, 5th edition (Bedford: Worth, 2003), referred to in the
schedule as Mankiw5.

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Fulbright Economics Teaching Program
Academic year 2005-2006

Macroeconomics

Course Syllabus

The textbook has a useful website. Make sure to visit it at:

<http://bcs.worthpublishers.com/mankiw5>

-----, 2003, *Macroeconomics*, 2nd edition (Bedford: Freeman Worth)
(Available in Vietnamese), Referred to in the schedule as Mankiw2V

Barth, Richard and William Hemphill, 2002, *Financial Programming and Policy: The Case of Turkey*, (*Washington DC: International Monetary Fund*), referred to in the schedule as FP.

Reference Textbooks

Olivier Blanchard, *Macroeconomics*, 2nd Edition (Prentice-Hall, 2000), referred to in the schedule as Blanchard.

Pham Chung, *Kinh te Vi mo Phan tich*, National University Publisher, 2002

Other References

International Monetary Fund, 2004, *Vietnam: Poverty Reduction Strategy Paper*, Country Report No. 04/25 (referred to as PRSP2004), February.

This is the same as *Comprehensive Poverty Reduction and Growth Strategy (CPRGS)* approved by the Prime Minister as Document No. 2685/VPCP-QHQT, dated 21th May

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2002)

[ in

Vietnamese] <http://www.imf.org/external/pubs/ft/scr/2004/cr0425.pdf>

-----, 2005 Vietnam: 2004 Article IV Consultation Staff Reports (referred to as SR2005), Country report No5/148

[www.imf.org/external/pubs/cat/longres.cfm.sk=18235.0](http://www.imf.org/external/pubs/cat/longres.cfm.sk=18235.0)

-----, 2003 Vietnam: 2003 Article IV Consultation Staff Reports (referred to as SR2003).  
Country report No. 3/380

<http://www.imf.org/external/pubs/ft/scr/2003/cr03380.pdf>

-----, 2003, Vietnam: Selected Issues, Country Report, No. 03/381 (referred to as Issues2003), December.

<http://www.imf.org/external/pubs/ft/scr/2003/cr03381.pdf>

-----, 2003, Vietnam: Statistical Appendix, Country Report No. 03/382 (referred to as **SA2003**), **December**.

<http://www.imf.org/external/pubs/ft/scr/2003/cr03382.pdf>

-----, 2002, Vietnam: Staff Report Second Review Under the PRGF, Country Report No. 02/151, June (referred to as SR2002).

<http://www.imf.org/external/pubs/ft/scr/2002/cr02151.pdf>



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Course Syllabus

-----, 1998, *Monetary Statistics Manual* (Washington DC: International Monetary Fund).

-----, 1993, *Balance of Payments Manual*, 5<sup>th</sup> Edition (Washington DC: International Monetary Fund)

-----, 1984, *A Guide to Money and Banking Statistics in International Financial Statistics*,

Socialist Republic of Vietnam, 2002. **Letter of Intent, Memorandum of Economic and Financial Policies and Technical Memorandum of Understanding.** Hanoi, June 3, (LOI2002)  
<http://www.imf.org/external/np/loi/2002/vnm/01/index.htm>

United Nations, 1993, *Systems of National Accounts*, (New York: United Nations).

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4

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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Course Syllabus

## Macroeconomics: Course Schedule Fall 2005

**Mankiw5** : Mankiw's Macroeconomics, 5<sup>th</sup> Edition . *Required readings consist of lecture notes, including PowerPoint 5<sup>th</sup> Edition, the summaries of chapters, and relevant sections that you may select to consult for understanding those notes and summaries.* Other readings or notes may be assigned or distributed whenever needed.

**Mankiw 2-V: Mankiw's Macroeconomics, 2<sup>nd</sup> Edition translated into Vietnamese**

**FP: Financial Programming and Policy: The Case of Turkey.**

**Blanchard: his Macroeconomics, 2<sup>nd</sup> Edition.**

To achieve the course objectives, the schedule may be modified as needed.

| <i>Week</i> | <i>Tuesday</i>                                                                                                                                                                                                                                                                        | <i>Thursday</i>                                                                                                                                                                                                                                                                 | <i>Friday</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | 6 Sep                                                                                                                                                                                                                                                                                 | 8 Sep                                                                                                                                                                                                                                                                           | 9 Sep                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1           | <p><b>I. Introduction</b></p> <p><i>Course objectives and road map</i></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary.</li> <li>- Mankiw5, Ch.1</li> <li>- Mankiw 2V, Ch. 1</li> </ul> <p><i>Measuring main macroeconomic aggregates</i></p> <p>-</p> | <p><b>II. Basic model for analysis and policy: Setting the model</b></p> <p><i>National income accounts</i></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary.</li> <li>- Mankiw5, Ch. 3, skip 3-2</li> <li>- Mankiw 2V, Ch.3, skip 3-2</li> </ul> | <p><b>II- Basic model for analysis and policy: Stylizing intersectoral linkages (cont.).</b></p> <p>Relations between the real , fiscal, money and external sectors :</p> <p>FP: Real sector: pp. 23-35, Box 1.2, p.33; Fiscal sector: Tables 2.1 and 2.2, pp. 97-98; BOP: Box 3.3, p.121; and monetary sector: Box 4.6, p. 169.</p> <p>Due to the Opening Ceremony, the subject matter of this session will be examined during the preceding and following sessions</p> |

|   |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                               |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
|   | <p>Lecturer notes and chapters - Mankiw5, Ch. 2 - Mankiw 2V, Ch. 2</p> <p><b>Problem Set (PS) 1 Distributed; due 13/9</b></p>                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                               |
| 2 | <p>13 Sep</p> <p><b>II. Basic model for analysis and policy: Sampling of policy experiments (end).</b><br/> <i>Tracing impacts of fiscal and monetary policies on output, inflation, and balance of payments (BOP)</i></p> <p>- A simple comprehensive model, Mankiw5, pp. 375-76</p> <p><b>PS 1 due, PS 2 distributed, due 20/9</b></p> | <p>15 Sep</p> <p><b>III. Instruments: Fiscal Sector Analysis and Policies</b></p> <p><i>GFS classification, fiscal, tax and expenditure analyses and policies</i><br/>         - FP, Ch. 2, pp. 60-87</p> <p><b>III. Instruments: Monetary Sector Analysis and Policies (cont.).</b></p> <p><i>Monetary survey, money supply and demand, and monetary policy instruments</i></p> <p>- FP, pp.152-92<br/>         - Lecture notes and chapter summaries<br/>         - Mankiw5, Ch. 4 and 18</p> | <p>16 Sep</p> <p><b>-Review &amp; discussion</b></p> <p>-</p> |

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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Course Syllabus

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                    |                                                                                                                                                                                       |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                     | - Mankiw 2V, Ch. 6 and 18-1                                                                                                                                                                                                        |                                                                                                                                                                                       |
| 3 | <p style="text-align: right;">20 Sep</p> <p><b>III. Instruments: Balance of Payments (BOP) Analysis and Policies (end).</b></p> <p>Standard classification, various BOP balance analyses; trade, financial and capital, international reserves, debt, and exchange rate policies</p> <p>-</p> <p>- FP, pp. 112-38</p> <p>- Lecture notes and chapter summary</p> <p>- Mankiw5, Ch. 5</p> <p>- Mankiw 2V, Ch. 7, skip 7-1</p> <p><b>PS 2 due</b></p> | <p style="text-align: right;">22 Sep</p> <p><b>IV. Impact of instruments on the economy: Aggregate Demand: the IS/LM Model</b></p> <p>- Lecture notes and chapter summary -</p> <p>- Mankiw5, Ch. 10</p> <p>- Mankiw 2V, Ch. 9</p> | <p style="text-align: right;">23 Sep</p> <p><b>-Review &amp; discussion</b></p>                                                                                                       |
| 4 | <p style="text-align: right;">27 Sep</p> <p><b>IV. Impact of instruments on the economy Aggregate Demand in the closed economy (cont.)</b></p> <p>- Lecture notes and chapter summary</p>                                                                                                                                                                                                                                                           | <p style="text-align: right;">29 Sep</p> <p><b>Midterm Examination</b></p>                                                                                                                                                         | <p style="text-align: right;">30Sep</p> <p><b>-Review &amp; discussion and/or Case study 1: Vietnam- Recent economic developments and policies (SR2003); or Vietnam Inflation</b></p> |

|   |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                 |                                                                          |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
|   | <p>- Mankiw, 2V, Ch. 10<br/>Ch.11,<br/>pp.281<br/>310<br/>PS 3 distributed, due 4/10</p>                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                 |                                                                          |
| 5 | <p style="text-align: right;">4 Oct</p> <p><b>IV. Impact of instruments on the economy Aggregate Demand in the Open Economy (cont.)</b></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary</li> <li>- Mankiw5, Ch.12</li> <li>- Mankiw 2V, Ch. 13</li> </ul> <p><b>PS 3 due</b><br/><b>PS 4 distributed, due 11/10</b></p> | <p style="text-align: right;">6 Oct</p> <p><b>IV. Impact of instruments on the economy Aggregate Supply and unemployment (end)</b></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summaries</li> <li>- Mankiw5, Ch. 6 &amp; 13</li> <li>- Mankiw 2V, Ch. 5 &amp; 11</li> </ul> <p>-</p> | <p style="text-align: right;">7 Oct</p> <p>- Review &amp; discussion</p> |



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Course Syllabus

|   |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                   |                                                                                                                             |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 6 | <p>11 Oct<br/><b>V. Economic growth ;Analytics and Structural Policies</b></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary</li> <li>- Mankiw5, Ch. 7</li> <li>- Mankiw 2V, Ch. 4</li> </ul> <p><b>PS 4 due;</b><br/><b>PS 5 distributed, due 18/10</b></p> | <p>13 Oct<br/><b>V. Economic growth: Analytics and Structural Policies (end)</b></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary</li> <li>- Mankiw5, Ch. 8,</li> <li>- Mankiw 2V, Ch. 4</li> </ul> | <p>14 Oct<br/><b>Case Study 2: Vietnam -Poverty Reduction Program ( PRSP2004); or</b><br/>China Foreign Exchange Policy</p> |
| 7 | <p>18 Oct<br/><b>V. Macroeconomic Policy Debates: Rule or discretion</b></p> <ul style="list-style-type: none"> <li>- Lecture notes and chapter summary</li> <li>- Mankiw5 , Ch. 14</li> <li>-Mankiw 2<sup>nd</sup>, Ch. 12&amp;14</li> </ul> <p><b>PS 5 due</b></p>                      | <p>20 Oct<br/><b>VI. Epilogue: Resolved and Unresolved Macroeconomic Questions</b></p> <p>Mankiw5 , pp. 519-25</p>                                                                                                                | <p>21 Oct<br/>Review &amp; discussion</p>                                                                                   |
| 8 | <p>24 Oct<br/>Office hours and Review</p>                                                                                                                                                                                                                                                 | <p>25 Oct<br/><b>Final Examination</b></p>                                                                                                                                                                                        | <p>28 Oct<br/>Free</p>                                                                                                      |

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7

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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-term examinations

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Mid-Term Examinations**

**Thursday: 8:30 a.m., September 29 2005**

Duration: 2:30 hours

**National accounts**

1. In a study group on national accounts, participant A affirmed that:  
The computation of GDP includes the price of intermediate goods in the market price of the final goods

Participant B replied:

Dear Participant A your affirmation is incorrect because one way of measuring GDP is adding all the value added in the economy.

Explain who is right ( 3 points)

2. If nominal GDP increases by 9% and real GDP increases by 4%. What is the approximate rate of inflation measured by the GDP deflator. ( 3 points)

3. If GDP increases by 6% and the price level increases by 3%

3. Real GDP increases by 6% and population grows by 2%. What is the impact on GDP per capita. ( 3 points)
4. Country A is represented by the model ( 8 points)

$$Y_a = C_a + G_a$$

$$C_a = C_{a0} + .a Y_a$$

Where  $Y_a$  = income of country A  
 $C_a$  = the consumption function of country A  
 $.a$  = MPC of country A

Similarly country B is represented by the following model. It has a lower marginal propensity to consume than country A:

$$Y_b = C_b + G_b$$

$$C_b = C_{b0} + .b Y_b$$

$.b$  = MPC of country B and  $.b < .a$

Which country has a larger increase in its income, if the governments in both countries decide, by coincidence, to increase their expenditure by the same amount  $. G_a = . G_b$ . Provide the economic reasoning for your answer. No credit will be given, if you mention only the name country.



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-term examinations

5. In an open economy, national saving  $S$ , total investment  $I$ , are linked to the external current account, and the net capital flows.
  - a. Write down and explain in words this relation ( 4 points)
  - b.  $S-I$  is always equal to zero,  $S-I=0$  . Is this statement correct. Explain the conditions under which the statement is correct. ( 4 points)
  - c. Explain under which conditions if
    - (i)  $S-I > 0$  ; ( 4 points); and
    - (ii)  $S-I < 0$ , how these domestic disequilibria are financed. ( 4 points)

### **Fiscal Policy**

6. The government increase its expenditure to build roads, a deficit ensues:  
 $DEF = T - G < 0$ ,
  - a. Indicate what are the possible sources of financing of the deficit. (Use the identity for the fiscal sector) ( 4 points)
  - b. If the government wants to minimize the pressures on prices, resulting from the fiscal deficit increase, what kind of financing would it resort to. And

- why.
- c. ~~The~~ government has the option to borrow from the domestic public or from ~~abroad~~, thus incurring an increase in domestic or in foreign debt. Which option would you recommend to the government and why. ( 4 points)

### **Monetary Policy**

7. An increase in the supply of real money balance will lower the equilibrium interest rates. Is this correct . Why. ( 5 points)
8. An increase in income raises money demand and the equilibrium interest rates. Is this correct . Why. ( 5 points)
9. You are a member of a multilateral financial organization team, just arriving in a country to conduct a discussion on monetary policy with the authorities. The country has a managed floating exchange rate. You may find the following events.
- a. The central bank just increased its reserve requirements on deposits of the private sector with the commercial banks. What might you infer from this action on the main economic issue of this country. ( 5 points)



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-term examinations

- b. The central bank just lowered its discount rate. What might you infer from this action on the main economic issue of this country. ( 5 points)
- c. The central bank just sold treasury bonds to the commercial banks. What might you infer from this action on the main economic issue of this country. ( 5 points)

### IS-LM and Policies

10. Assume an economy is described by the following equations:

- (1)  $Y = C + I + G$
- (2)  $C = C_0 + c(Y - T)$
- (3)  $I = I_0 - dr$
- (4)  $G = G_0$
- (5)  $T = T_0 + tY$
- (6)  $MOQ/P = MOQ_0$  and  $P=1$
- (7)  $L(r, Y) = fY - gr$

Where:  $Y$ = income,  $C$ = private consumption,  $I$  = private investment,  $G$  = total government expenditure,  $T$ = government revenue,  $MOQ$ = broad money,  $MOQ_0$ = given broad money stock,  $P$ = price level assumed to be fixed,  $L(r, Y)$ = demand for real money balance; and



$c = \text{MPC}$ ;  $r = \text{real interest rate}$ ;  $t = \text{marginal tax coefficient}$ ;  $b = \text{sensitivity coefficient of investment to interest rate}$ ,  $f$  and  $g = \text{sensitivity coefficients of money demand to income and interest rate respectively}$ .

- a. Derive the IS equation and determine slope of the IS curve. ( 4 points)
- b. Derive the LM equation and determine slope of the LM curve. ( 4 points)

Draw the IS and LM curves to experiment with the following situations. Note that the changes in the selected aggregates in each question are relative to the initial model, changes from one question do not carry to the subsequent questions, unless otherwise indicated.

- c. Determine the equilibrium income (output) ( $Y_1$ ), equilibrium interest rate ( $r_1$ ), that satisfy the equilibrium in both the goods and the money markets. ( 4 points)
- d. Suppose that an economy is overheated, as in China in 2005. The government may want to reduce aggregate demand through cut in its expenditure  $G$  by  $\Delta G$ .
  - (i) Will the IS curve shift down to the left or up to the right ( 2 points)
  - (ii) How are  $Y$ ,  $r$ , changed . ( 2 points)



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-term examinations

- (iii) Provide intuitive explanations for those shift and changes. ( 2 points)
- e. To avoid a recession, in 2001, the US authorities wanted to increase output and employment by cutting T by . T.
- (i). Will the IS curve shift down to the left or up to the right ( 2 points)  
(ii). How are Y, r, changed . ( 2 points)  
(iii) Provide intuitive explanations for those shift and changes. ( 2 points)
- f. Inflation tends to rise, as in Vietnam in 2005, to reduce inflation, the central bank may want to reduce the money supply through selling bonds to commercial banks.
- (i) If the money supply is to be reduced by . MOQs, will the LM curve shift down to the right or up to the left . (2 points)  
(ii) How are Y, r, changed . (2 points)  
(iii) Provide intuitive explanations for those shift and changes. ( 2 points)

### **Bonus**

11. Given the consumption function:  

$$C = 100 + 0.8 (Y-T)$$

- And T  
is a  
lump sum tax and is equal to 20
- a. To the question: what is the increase in C following an increase of 1 unit in Y, participant A answers: 0.8. Is the participant A correct. Why. If participant is A incorrect, provide the correct answer. ( 2 points )
- b. If the government raises T by 10 to  $T=30$ , participant As answer to the same question is 0.8. Is the participant A correct. Why. If participant A is incorrect, provide the correct answer. ( 2 points )
- c. If the government raises a proportional tax  $T=tY$  and  $0 < t < 1$ ; participant As answer to the same question is 0.8. Is the participant A correct. Why. If participant A is incorrect, provide the correct answer. ( 2 points )

### Overall Analysis

12. Following the drastic increase in international oil prices, the world economy would enter a recession, leading to a drop in FDI net inflows into Vietnam. What are the impacts of this potential situation on the economy of Vietnam.
- a. To trace those impacts write down the equations representing the real, fiscal, monetary and the external sectors, the quantity equation, the Fisher equation, and



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-term examinations

the relations between the real, nominal, exchange rate and domestic and foreign prices. ( 7 points)

- b. Using the model set up above to trace qualitatively the impact of such an event on the economy of Vietnam.
- (i) For the first round impacts, (3 points); and
  - (ii) For the second round impacts. ( 3 points)

Indicate clearly the impacts on selected economic objectives--namely GDP, inflation, and net foreign assets and other relevant aggregates. This means that you should clearly indicate the direction of change of each aggregate and provide a short explanation why that change takes place.

Thai Van Can

5





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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Mid-Term Examinations :Answers**

**Thursday: 8:30 a.m., September 29 2005**

Duration: 2:30 hours

**National accounts**

1. In a study group on national accounts, participant A affirmed that:  
The computation of GDP includes the prices of intermediate goods in the market price of the final goods

Participant B replied:

Dear Participant A your affirmation is incorrect because one way of measuring GDP is adding all the value added in the economy.

Explain who is right ( 3 points)

Answer

Participant A is right because GDP is the sum of the market prices of all final goods and services produced in a country during a given period of time.

*Participant A is correct. GDP at current prices is ~~defined as the value of final~~ defined within an economy in a given period and valued at market prices. The market prices of final goods and services include the prices of intermediate goods which are the costs in the production of final goods and services.*

*Participant B is also correct. One way of measuring GDP is adding all the value added in the economy. The value added from the production of the intermediate goods as well as the value added from the production of final goods are included in the computation of GDP.*

2. If nominal GDP increases by 9% and real GDP increases by 4%. What is the approximate rate of inflation measured by the GDP deflator. ( 3 points)

**Answer**

$$\begin{aligned} \text{Nominal GDP} &= P \times \text{real GDP} \\ \% \text{ Nominal GDP} &= \% P + \% \text{ real GDP} \Rightarrow \\ \% P &= \% \text{ Nominal GDP} - \% \text{ real GDP} \\ 9\% - 4\% &= 5\% \end{aligned}$$



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

3. Real GDP increases by 6% and population grows by 2%. What is the approximate rate of growth in real GDP per capita. ( 3 points)

**Answer**

*Definition of per capita real GDP: Per capita real GDP = Real GDP/ Population*  
*% Per capita real GDP= % Real GDP - % Population*

$$= 6\% - 2\% = 4\%$$

4. Country A is represented by the model ( 8 points)

$$Y_a = C_a + G_a$$

$$C_a = C_{a0} + .a Y_a$$

Where  $Y_a$  = income of country A  
 $C_a$  = the consumption function of country A  
.a = MPC of country A

Similarly country B is represented by the following model. It has a lower marginal propensity to consume than country A:

$$Y_b = C_b + G_b$$

$$C_b = C_{b0} + .b Y_b$$

.b= MPC of  
country B

and .b<. Which country has a larger increase in its income, if the governments in both countries decide, by coincidence, to increase their expenditure by the same amount . Ga=. Gb. Provide the economic reasoning for your answer. No credit will be given, if you mention only the name country.

**Answer**

*The country with a higher MPC will have a larger increase in income, if both countries decide to increase government expenditure by the same amount.*

*An increase in government expenditure will raise planned aggregate demand, thus production, thus income, thus consumption, which in turn, raises aggregate demand and production, so on. A country with a higher MPC has a higher level of consumption- because it consumes more from a unit increase in income and its multiplier is higher-, thus a higher aggregate demand, a higher production, and higher income.*

*Formally,*

*For country A and B respectively,*

$$Y_a = [1 / (1 - a)] (C_a + G_a)$$

$$Y_b = [1 / (1 - b)] (C_b + G_b)$$

*And*



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

$$dYa/dGa = 1/(1-a)$$

$$dYb/dGb = 1/(1-b)$$

and if  $b < a \Rightarrow (1-b) > (1-a) \Rightarrow 1/(1-b) < 1/(1-a) \Rightarrow$   
 $dYa/dGa > dYb/dGb$

5. In an open economy, national saving  $S$ , total investment  $I$ , are linked to the external current account, and the net capital flows.
- a. Write down and explain in words this relation ( 4 points)

**Answer**

$$SI = XM + FS_n + GRT = CA$$

*The gap between national saving  $S$  and total investment  $I$  is financed by external saving measured by the external current account  $CA$*

*We also know that the external current account is financed by net capital flows with the opposite sign.*

$$CA = -CF$$

*For example, an external current account surplus is financed by net capital inflows in the BOP, which is  $CA + CF = 0$ .*

*Thus:  $S I = CA = -CF$ , meaning that the gap between  $S$  over  $I$ , is financed by external saving which is measured by net capital flows. For example, in the familiar context of  $S-I < 0$ , the shortage in national saving to finance total investment is financed by external saving or by a net inflow of capital*

- b.  $S-I$  is always equal to zero,  $S-I=0$ . Is this statement correct. Explain the conditions under which the statement is correct. ( 4 points)

**Answer**

*No,  $S - I$  may be different from zero. The statement that  $S= I$  is correct when national saving is equal total investment which is reflected in the equilibrium in the external current account, where exports are equal imports plus net flows of factor services and of grants..*

$$SI = 0 \Rightarrow XM + FS_n + GRT = 0 \Rightarrow X = M + FS_n + GRT$$

- c. Explain under which conditions if





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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

- (i)  $S-I > 0$  ; ( 4 points); and  
(ii)  $S-I < 0$ , how these domestic disequilibria are financed. ( 4 points)

### Answer

- (i)  $S I > 0 \Rightarrow$  if national saving is higher than investment:  $S > I \Rightarrow$  a surplus in the CA, which is:  $CA > 0$   
(ii)  $S I < 0 \Rightarrow$  if national saving is lower than investment:  $S < I \Rightarrow$  a deficit in the CA, which is:  $CA < 0$

### Fiscal Policy

6. The government increase its expenditure to build roads, a deficit ensues:  
 $DEF = T - G < 0$ ,
- a. Indicate what are the possible sources of financing of the deficit. Use the identity for the fiscal sector. ( 4 points)

### Answer

*The fiscal deficit DEF may be financed by borrowing from the domestic banking system .NDCg, borrowing from domestic nonbank public: BRWg, foreign grant, GRTg, and incurred foreign debt ( Dg = borrowing from abroad)*

$$DEF = .NDCg + BRWg + GRTg + Dg$$

- b. If the government wants to minimize the pressures on prices, resulting from the fiscal deficit increase, what kind of financing would it resort to. And why. ( 4 points)

**Answer**

*The government should borrow from domestic nonbank public, BRWg, to finance its deficit, because this does not involve an increase in the money supply. All other financing modes involve increases in the money supply through either increase in bank credit .NDCg, or increase in NFA with inflows of funds from abroad, GRTg, Dg*

- c. The government has the option to borrow from the domestic public or from abroad, thus incurring an increase in domestic or in foreign debt. Which option would you recommend to the government and why. ( 4 points)

**Answer**



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

*The government should borrow from the domestic public. Borrowing abroad might increase inflationary pressures by increasing the money supply through increase in NFA, it has the additional disadvantage of repayment in foreign exchange*

### **Monetary Policy**

7. An increase in the supply of real money balance will lower the equilibrium interest rates. Is this correct . Why. ( 5 points)

**Answer**

*Yes, it is correct. An increase in the supply of real money balance will, given unchanged money demand, lead to an excess of money supply which could be reduced by an increase in demand for real money balance through a decline in the interest rate to reestablish the equilibrium in the money market.*

8. An increase in income raises money demand and the equilibrium interest rates. Is this correct . Why. ( 5 points)

**Answer**

*Yes, it is correct. An increase in income raises money demand which, given the unchanged money supply, will lead to an excess of money demand, which could be reduced by an increase in the interest rate to reestablish the equilibrium in the money market.*

9. You are a member of a multilateral financial organization team, just arriving in a

country to conduct a discussion on monetary policy with the authorities. The exchange rate. You may find the following events.

- a. The central bank just increased its reserve requirements on deposits of the private sector with the commercial banks. What might you infer from this action on the main economic issue of this country. ( 5 points)

**Answer**

*An increase in the reserve requirements on deposits of the private sector with commercial banks is to require more reserves for the same amount of deposits. The increased reserves would reduce the capacity of commercial banks to grant credit to the economy, thus reducing the money supply, and reducing inflation pressures. The major issue of this country might be inflation pressures.*

- b. The central bank just lowered its discount rate. What might you infer from this action on the main economic issue of this country. ( 5 points)

**Answer**

*A lowering of the discount rate tends to reduce the cost of borrowing by banks at the central bank. Banks tend to pass on part of the reduced cost in the credit granted to their customers and planned investment tends to increase. This would increase planned aggregate demand, production, and income. Thus, the major issue of this country might be a recession.*



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

The central bank just sold treasury bonds to the commercial banks. What might you infer from this action on the main economic issue of this country.  
(5 points)

### **Answer**

*Selling treasury bonds to commercial banks is to reduce the liquidity as commercial banks transfer liquidity (funds, money) to the central bank in exchange for holding treasury bonds. The money supply tends to be reduced relative to money demand, to reestablish equilibrium in the money market, interest rate has to rise, thereby reducing planned investment, aggregate demand, production, income. By reducing aggregate demand, inflation pressures tend to be reduced.. Thus, the major issues of this country might be an overheated economy (with inflation pressures).*

### **IS-LM and Policies**

10. Assume an economy is described by the following equations:

- (1)  $Y = C + I + G$
- (2)  $C = C_0 + c(Y - T)$
- (3)  $I = I_0 - dr$
- (4)  $G = G_0$



- (5)  $I =$   
 (6)  $M^o/P = M^o/P_0$  and  $P=1$   
 (7)  $L(r, Y) = fY - gr$

Where:  $Y$  = income,  $C$  = private consumption,  $I$  = private investment,  $G$  = total government expenditure,  $T$  = government revenue,  $M^o$  = broad money,  $M^o/P_0$  = given broad money stock,  $P$  = price level assumed to be fixed,  $L(r, Y)$  = demand for real money balance; and  
 $c$  = MPC and  $0 < c < 1$ ;  $r$  = real interest rate;  $t$  = marginal rate of taxation, and  $0 < t < 1$ ;  $d$  = sensitivity coefficient of investment to interest rate,  $f$  and  $g$  = sensitivity coefficients of money demand to income and interest rate respectively.

- a. Derive the IS equation and determine slope of the IS curve. ( 4 points)

**Answer**

Put ( 2-5) into (1), one obtains:

$$\text{IS: } Y = [1/(1-c+ct)] ( C_0 - cT_0 + I_0 + G_0 ) - [1/(1-c+ct)] dr ; \text{ or}$$

$$r = ( C_0 - cT_0 + I_0 + G_0 ) - [1/(1-c+ct)]d Y$$

The coefficient of  $r$  : {Minus  $[1/(1-c+ct)] d$  }, is clearly negative and the IS curve is sloping downward.



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

- b. Derive the LM equation and determine slope of the LM curve. ( 4 points)

$$\text{LM: } fY = \text{MOQ}_0 + gr; \text{ or}$$
$$r = -(1/g) \text{MOQ}_0 + f/g Y$$

Draw the IS and LM curves to experiment with the following situations.

Note that the changes in the selected aggregates in each question are relative to the initial model, changes from one question do not carry to the subsequent questions, unless otherwise indicated.

- c. Determine the equilibrium income (output) ( $Y_1$ ), equilibrium interest rate ( $r_1$ ) that satisfy the equilibrium in both the goods and the money markets. ( 4 points)

### Answer

[Draw the figure]

*Draw the IS-LM curves in the  $(Y, r)$  space, the intersection of IS and LM determines the equilibrium  $Y_1$  and  $r_1$ .*

- d. Suppose that an economy is overheated, as in China in 2005. The government may want to reduce aggregate demand through cut in its expenditure  $G$  by  $.G$ .

- (i) Will the IS curve shift down to the left or up to the right  
( 2 points)

**Answer**

The IS curve shifts down to the left.

- (ii) How are  $Y$ ,  $r$ , changed . ( 2 points)

**Answer**

*The downward shift of the IS curve, given the unchanged, upward sloping LM curve, reduces income to  $Y_2$  and the interest rate to  $r_2$ . shifts down to the left.*

- (iii) Provide intuitive explanations for those shifts and changes. ( 2 points)

**Answer**



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

The IS curve shifts down to the left because cut in G reduces *planned expenditure, thus aggregate demand, production, income, at each interest rates.*

*Given the LM upward sloping curve, the interest rate declines. This reflects the fact that lower income reduces the demand for money. Given the unchanged money supply, which has become higher than the money demand, the interest rate has to decline to raise the money to make it raising to the unchanged money supply. The new  $Y_2$  and  $r_2$  are lower than  $Y_1$ ,  $r_1$*

- e. To avoid a recession, in 2001, the US authorities wanted to increase output and employment by cutting T by  $\Delta T$ .
- (i). Will the IS curve shift down to the left or up to the right ( 2 points)

**Answer**

*The IS curve shifts up to the right.*

- (ii). How are Y, r, changed . ( 2 points)

**Answer**

*The upward shift of the IS curve, given the unchanged money supply and the interest rate to  $r_3$ .*  
~~Given the unchanged money supply and the interest rate to  $r_3$ .~~  
*sloping*

(iii) Provide intuitive explanations for those shift and changes. ( 2 points)

*The reduction in  $T$  raises disposable income, thus planned consumption, thus planned aggregate demand, thus production, thus income, at each interest rates, the IS curve shifts upward. Given the LM upward sloping curve, the interest rate increases. This reflects the fact that higher income raises the demand for money, since the supply of money remains unchanged, the interest rate has to rise to reduce the demand for money to make it equal to the unchanged supply of money. The new  $Y_3$  and  $r_3$  are higher than  $Y_1$ ,  $r_1$ .*

#### **Answer**

- f. Inflation tends to rise, as in Vietnam in 2005, to reduce inflation, the central bank may want to reduce the money supply through selling bonds to commercial banks.
- (i) If the money supply is to be reduced by .MOQs, will the LM curve shift down to the right or up to the left .  
 (2 points)

#### **Answer**





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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

***The LM curve shift up to the left.***

(ii) How are  $Y$ ,  $r$ , changed . (2 points)

**Answer**

*The upward shift of the LM curve to the left, given the unchanged, downward sloping IS curve, reduces income to  $Y_4$  and raises interest rate to  $r_4$ .*

(iii) Provide intuitive explanations for those shift and changes. ( 2 points)

**Answer**

*The decrease in  $MOQs$  must be matched by a decrease in money demand. This may be achieved by a rise in the interest rates at each level of  $Y$ , therefore, the LM curve shifts up to the left. Given the IS downward sloping curve, the interest rate increases and income declines. This reflects the fact that the higher interest rate reduces planned investment, thus aggregate demand, thus production, and thus income. The new  $Y_4$  is lower than  $Y_1$  and  $r_4$  is higher  $r_1$*

**Bonus**

11. Given the consumption function:

$$C = 100 + 0.8 (Y-T)$$

And T is a lump sum tax and is equal to 20

a. To the question: what is the increase in C following an increase of 1 unit in Y, participant A answers: 0.8. Is the participant A correct. Why. If participant is A incorrect, provide the correct answer. ( 2 points )

**Answer**

**The consumption function may be rewritten as:**

$$(1) C = 100 + 0.8 Y - 0.8T$$

*The participant A is correct. The MPC relative to income is the change in C resulting from a unit change in Y. This is  $dC/dY = 0.8$ .*

b. If the government raises T by 10 to T= 30, participant As answer to the same question is 0.8. Is the participant A correct. Why. If participant A is incorrect, provide the correct answer. ( 2 points )

**Answer**

*The participant A is correct. The MPC relative to income Y is still the change in C resulting from a unit change in Y. This is  $dC/dY = 0.8$ . The change in the lump*



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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

*sum tax does not have impact of the MPC relative to income because change in  $T$  does not affect  $Y$ .*

c. If the government raises a proportional tax  $T = tY$  and  $0 < t < 1$ ; participant A's answer to the same question is 0.8. Is the participant A correct. Why. If participant A is incorrect, provide the correct answer. ( 2 points )

### **Answer**

**Equation (1) becomes:**

$$C = C_0 + c ( Y - tY ) = C_0 + c ( 1 - t ) Y$$

*The participant A is wrong, because change in  $T$  affects  $Y$ , which in turn affects  $C$ . Therefore a change in one unit of  $Y$  changes  $C$  by  $c ( 1 - t )$ , which is less than 0.8 because  $(1-t)$  is less than 1.*

### **Overall Analysis**

12. Following the drastic increase in international oil prices, the world economy would enter a recession, leading to a drop in FDI net inflows into Vietnam. What are the impacts of this potential situation on the economy of Vietnam.

a. To trace those impacts write down the equations representing the real, fiscal, monetary and the external sectors, the quantity equation, the Fisher equation, and the relations between the real, nominal, exchange rate and domestic and foreign

prices.

Answer ( 7

points)  
See lecture notes for the equations.

b. Using the model set up above to trace qualitatively the impact of such an event on the economy of Vietnam.

(i) For the first round impacts, (3 points); and

(ii) For the second round impacts. ( 3 points)

Indicate clearly the impacts on selected economic objectives--namely GDP, inflation, and net foreign assets and other relevant aggregates. This means that you should clearly indicate the direction of change of each aggregate and provide a short explanation why that change takes place.

### Answer

#### A. BOP

1. Lower FDI, assuming NX remains unchanged, reduces net foreign assets of the banking system. [Note: a reduction in NFA means a liquidation of placements in



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Macroeconomics

Mid-Term Examinations :Answers

*foreign countries to bring capital home; an increase in NFA means the reverse] ; BOP is in equilibrium . $NFA = CA + CF$  (other than . NFA). This lower NFA will affect the 1<sup>st</sup> round in the monetary sector.*

===

*2. Lower  $e$  from Exchange rate section below, increases NX, thus raising capital outflows, thus raising NFA to feed back into the Money sector; BOP is in equilibrium . $NFA = CA + CF$  (other than . NFA) .*

### **B. Monetary sector**

**1. 1<sup>st</sup> round. Lower NFA from BOP reduces  $MOQs$ , leading to  $MOQs < MOQd$ .**

#### **2. 2<sup>nd</sup> round**

*The 2<sup>nd</sup> round may start in this sector because it is likely that the adjustment is fast given the need of changing the interest rate. The excess money demand ( the higher money demand relative to money supply) is reduced by a rise in the interest rate until money demand is equal money supply in this round. Two effects: (1) higher interest rate reduce further  $I$  in the real sector, starting a new round in that sector; (ii) Lower  $MOQs$  reduces  $P$  in the 2<sup>nd</sup> round below in the Price and Exchange rate section . If the equilibrium is not established in this 2<sup>nd</sup> round, a 3<sup>rd</sup> round is considered, and so on, until the equilibrium is reached.*

==

**3. 3<sup>rd</sup> round. Higher NFA from BOP sector, raises  $MOQs$ , leading to  $MOQs >$**

*MOQd, leading to lower  $r$ , and the process continues until reaching equilibrium in the IS-LM model.*

### **B. Real sector**

1. *Lower FDI inflows reduces planned investment, reduce planned aggregate demand, reduce production, and reduce income  $Y$ , thus  $Y_s = Y_d$ .*
2. *Higher interest from the 2<sup>nd</sup> round in Money, reduces investment, expenditure, aggregate demand, production and income; thus we have another lower  $Y_s = Y_d$ . [The higher interest rate and lower income result may be derived by an upward shift in the IS curve, given the upward sloping LM curve. The upward shift in the IS curve may be translated into a downward shift in the aggregate demand curve leading to a lower  $P$  and lower  $Y$ ]*

### **C. Fiscal sector**

1. *Assume tax revenue  $T = tY$ ; lower  $Y$  reduces  $T$ , increase the deficit  $DEF$ , given unchanged government expenditure, thus  $DEF >$  financing.*
2. *From the 2<sup>nd</sup> round in the monetary sector,  $MOQ_s = MOQ_d$ , for simplicity, assuming that, the government does not want to change this equilibrium, it raises domestic borrowing  $BRW_g$  to finance the deficit, to make  $DEF = \text{Financing}$ , which is equal to:  $.NDC_g + BRW_g + GRT_g + D_g$ . Any*





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Academic year 2005-2006

Macroeconomics

Mid-Term Examinations :Answers

*other financing, .NDCg,, GRTg, and Dg, would raise MOQs, which would break the equilibrium between money demand and money supply, in the second round in money, and would require the start of another round.*

3. *Higher borrowing may raise  $r$  further in the 3<sup>rd</sup> round, to impact  $I$  in the real and monetary sector, and the process continues, until equilibrium is reached in all the markets.*

#### **E. Prices**

1. *Price level has not moved at the 1<sup>st</sup> round, it would decline in the 2<sup>nd</sup> round when the reduced MOQs is in equilibrium with  $MOQ_d$ .*
2. *Lower MOQs from the 2<sup>nd</sup> round in monetary sector reduces  $P$ , which in turn reduces  $e$  in the second round below.*

#### **F. Exchange rate**

1.  *$e = e/P/P^*$ ; since  $P$  has not declined in this round yet, the real exchange rate  $e$  remains unchanged in this round;  $P^*$  is assumed unchanged.*
2. *Lower  $P$  from the 2<sup>nd</sup> round in Prices above, reduces  $e$ , which in turn, increases  $NX$  in the real sector and the BOP sector, and increase .NFA in the BOP sector, and the monetary sector, triggering a new round, etc.*

Thai Van Can/ Chau Van Thanh/ Nguyen Hoai Bao

12



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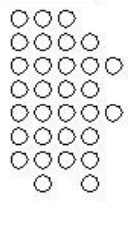
Macroeconomics

Lecture 1

Macroeconomics:  
Principles and Reasoning

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Thai Van Can



## Object of macroeconomics



Study economy as a whole and its main features: output, employment, inflation, exchange rate.

Study economic fluctuations and growth and corresponding policies for stabilization and growth promotion.



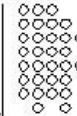
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2005-2006

Macroeconomics

Lecture 1

## Relations between micro and macro



### **From micro to macro: Microfoundations of macroeconomics** (Wages and prices)

Wage rigidities from institutional characteristics, such as contract

Price rigidities from market considerations, such as menu cost.

### **Macro and micro in action**

The necessity of coordination for efficient policy implementation.  
Integration of micro and macro is necessary. Lack of coordination  
was a major cause of the precipitous fall in output in the former  
Comecon countries

Macro provides the framework within which micro is  
implemented.

National objectives provide the general framework and provincial  
project implementations. Example of inconsistency problem  
mentioned in micro class.

IMF provides the macro framework for project financing from the  
WB or the ADB



## Course objectives



Enhance skills for macroeconomic analysis and policies to real life issues.

Polish macroeconomic reasoning as a language

What do you like to obtain from the course.

Effective, professional, competent responses to economic questions in interviews for jobs, press, radio, etc.



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Lecture 1

## Overall strategy



Emphasize the principles and the methodology for guidance through the intricacies of macroeconomic reasoning.

Objective: aiming at moving from foundations to high level of competence in economic reasoning to satisfy the challenge of diversity through establishment of common core knowledge.

## What are possible instruments.



1. Supply from resources of a knowledgeable and experienced teaching team
2. Demand from participants through intense individual focus and stamina to understand, memorize, explain subject
3. Interactions between teaching team and participants
  1. Lectures focus on main points owing to prior reading by participants.
  2. Exercises individually written
  3. Regular review: in each session, scheduled sessions, individual appointments
  4. Possible group appointments for one topic of common interest
4. Facilitation through study groups, exchanges and discussions on subject matters with colleagues;
5. Mutual support for learning from colleagues of diverse backgrounds



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2005-2006

Macroeconomics

Lecture 1

## Road map



Using the approach of objectives and instruments

Revisiting basic macroconcepts.

Representing an economy: real, fiscal, money, balance of payments to permit full appreciation of linkages.

Elaboration on and experiment with macropolicies and linkages for stabilization

Economic growth and structural policies

## General concepts of objectives and instruments



1. Tinbergen's Principle: Number of instruments must equal number of objectives for the latter to be achieved (Systems of  $2(n)$  equations and  $2(n)$  unknowns)
2. Main objectives of macroeconomic management: maximize output, minimize inflation, a certain amount of foreign exchange reserves.
3. Instruments: monetary policy (MP), fiscal policy (FP), and external policy (BOPP: trade policy, exchange rate policy)
4. Relative market efficiency classification: direct the instrument toward the objective where it has a relative efficiency: monetary policy to fight inflation and fiscal policy to increase aggregate demand.





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Fulbright Economics Teaching Program  
2005-2006

Macroeconomics

Lecture 1

## Revising basic macro concepts



### **Price index**

CPI= consumer price index  
WPI= wholesale price index  
GDP deflator

### **Real and nominal GDP**

GDP at constant prices= 1993. Meaning  
GDP at nominal prices

### **Foreign exchange reserve= foreign assets ( banking system)**

### **Exchange rate definitions**

Unit of one domestic currency in terms of foreign currencies  
Unit of one foreign currency in terms of domestic currencies

## Short term, medium term, and long term



### *In general:*

The definition of the short term, medium term, and long term varies according to the context of analysis.

Usually, short term is less than one year, medium term is less than 3 years, and longer term is more than 3 years, such as with financial instruments, e.g. bonds.

Medium term may be longer if one considers the repayment period for loans extended by the Fund in some of its lending programs.



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Macroeconomics

Lecture 1

## Short term, medium term, and long term



### *For our course :*

Short term: period of time when the physical amount of K and L are fixed, but the intensity of utilization may vary through working more hours, and actual price P is ***different from expected  $P_e$ , leading to fluctuations in output. Short term may be more than 1 year.***

Medium term: period of time when physical amount K and L are fixed, and actual price P is equal to expected  ***$P_e$ , leading to the natural rate of output***

Long term: period of time when physical amount K accumulates, L increases due to population growth and technology progresses, leading to LT economic growth.

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6



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Problem Set 1

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Problem set 1**

**(Due: 8:20 AM, 13/09/2005 )**

**Question 1:**

Which of the following economic variables are of flow concept or stock concept.

- 1) Income of a worker
- 2) Wealth of the worker
- 3) Total money in an economy
- 4) Total investment in an economy
- 5) Government saving
- 6) Real estate value in HCMC

**Question 2:**

The newly established Croatia this year wants to publish data on its national accounts. Yet, Croatian economists face difficulties in conducting study and computing key aggregates. Let help them fulfill this task.

**Data (in Croatia dollar)**

Consumption expenditure 80.000  
Income from leasing assets 2.000  
Net Factor Service -4.000  
Government spending 15.000  
Indirect tax 2.000  
Profit 18.000  
Capital depreciation 6.000  
Net investment 12.000  
Exports 30.000  
Wages and Salaries 70.000  
Imports 35.000  
Interest payment 10.000  
Direct tax 10.000  
Grants 5.000

Compute the following aggregates:

- 1) GDP and GNP at market price using expenditure and income approaches
- 2) Disposable national and individual incomes (YD and GNDI)
- 3) Sp, Sg, and total domestic saving.
- 4) Compare (S-I) and (X-M)





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Academic year 2005-2006

Macroeconomics

Problem Set 1

### **Question 3:**

A hypothetical economy has only 3 production units a) wheat ; b) wheat powder and c) bread. Suppose in 2004, wheat production unit sold  $\frac{4}{5}$  of its output value to the powder unit and stored the rest 20 as inventory. The powder unit, in turn, sold 100 output valued to the bread unit and increased its inventory by 30. The bread unit sold its 500 output value to final consumers. Calculate GDP in 2004, assuming that the wheat production unit did not purchase inputs.

### **Question 4:**

Suppose Croatia produces consumer goods that have prices and quantity given in the table below:

| <b>Products</b> | <b>2000<br/>Quantity</b> | <b>2000 Price<br/>(Thousand dong)</b> | <b>2000<br/>Quantity</b> | <b>2003 Price<br/>(Thousand<br/>dong)</b> |
|-----------------|--------------------------|---------------------------------------|--------------------------|-------------------------------------------|
| Video           | 1 unit                   | 1,000                                 | 120 unit                 | 800                                       |

|                |                     |     |                     |     |
|----------------|---------------------|-----|---------------------|-----|
| Electric power |                     | 0.5 | 1,000               | 0.7 |
| Food           | 200 tons            | 2   | 500 tons            | 3   |
| Gas            | 100 cm <sup>3</sup> | 100 | 200 cm <sup>3</sup> | 120 |
| kwh            |                     |     |                     |     |

Problems:

- a) Using the year 2000 as the base year, compute nominal and real GDP in 2004.
- b) The GDP deflator (Paasche index) in 2000 and 2004.
- a) The fixed-weight price index CPI (Laspeyres index) in 2000 and 2004
- b) Using the two indices to calculate growth rate of price level from 2000 to 2004.  
Explain why the resulting growth rates of price level are different for these two indices in calculation.

**Question 5:**

Explain how do the following transactions have any impact on Vietnam GNP. (increased, decreased, unchanged)

- a) Mrs. Lan sells the house that she bought 5 years ago
- b) Honda Vietnam imports a volume of spare parts from China
- c) Profit of ACER in HCMC, a 100% foreign owned company, increased by 10%
- d) Government increases subsidy for teachers in mountainous areas by 10%.
- e) In 2004 Huy Hoang Trading Company imported a 100-billion dong container of goods, 80% of which were sold out during the year.
- f) A Dutch tourist had haircuts in HCMC



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Academic year 2005-2006

Macroeconomics

Problem Set 1

**Question 6:**

A hypothetical closed economy is presented by the following set of equations:

Supply side

- |                         |                                |
|-------------------------|--------------------------------|
| a. Production function  | $Y = L^{0,5} K^{0,5}$          |
| b. Resource constraints | $L = 200 \quad v \quad K = 50$ |

Demand side

- c. Household consumption function  $C = 10 + 0,85 \cdot (Y - T)$
- d. Investment function  $I = 20 - 2r$
- e. Government Expenditure  $G = 20$
- f. Tax  $T = 20$

Problems:

- 1) Determine national income, real wage, real rental prices of capital and labor; income distributed to capital and labor
- 2)  $S_p$ ,  $S_g$ , and national saving
- 3) Determine equilibrium real interest rate in capital market
- 4) Show changes in national income, real wage, real rental prices of capital and labor when:
  - a. Government spending on national security increased to 2
  - b. Due to tax credit policy, investment increased by 10%
  - c. Tax reform resulted in 10% increase in revenue
  - d. Free migration raised labor force by 10%

**Question 7:**

From the data of IFS-MF or the General Statistics, construct a set of consistent data on Vietnam aggregates during 1996-2004 and (a) write a report describing difficulties and how you overcome these difficulties as you construct the data; and (b) discuss trends in the economy. Required economic aggregates include:

- 1)  $GDP_m$ ,  $GDP_f$  and GNP
- 2)  $FS_n$ , indirect tax
- 3) Value added in industry, agriculture and service
- 4) Net transfer from abroad, exports and imports of goods and services
- 5) Balance of current account, capital account and official aids
- 6) Consumption (private and government)
- 7) Private investment  $I_p$  and government investment  $I_g$
- 8)  $S_p$  and  $S_g$
- 9) Domestic saving and total national saving
- 10) Government revenue and expenditure, sources of financing



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 2

**Fulbright Economics Teaching Program  
Fall Semester, 2005  
MACROECONOMICS**

**PROBLEM SET 2**

***Distribution Date: Tuesday, September 13, 2005***

***Due Date: Tuesday, September 20, 2005***

*Write short answers in a few short sentences*

*Data for questions on Vietnam for 2002 are to be obtained from tables that were already distributed).*

*For all numerical questions, use symbols first to derive answers, and replace symbols by their numerical values to obtain numerical answers.*

**Question 1**

Suppose that  $GDP=Y$  is defined as:

$$Y = C + I + G + X - M$$

C= consumption of goods and services

I= Investment



G= government expenditure  
X= exports of goods and services  
M= imports of goods and services

Such a definition may be found in Mankiw, chapter 5, p.116

Referring to the System of National Accounts (SNA, 1993) as discussed in class, assess critically this definition.

1. If the above definitions for X and M are maintained, what would be Y equal to. Why.
2. If Y is maintained as GDP, what definitions should be given to X and M. why

### **Question 2**

With available data for Vietnam 2002, compute:

1. Saving, S
2. Investment, I
3. (a) External current account balance CA; (b) Provide the economic reasons for such a balance.

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Hoai Bao

1



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 2

4. (a) Verify:  $S - I = CA$ ; (b) Explain how the saving-investment gap was financed.
5. (a) Fiscal balance  $FB$ ; (b) What may be the stance of fiscal policy in 2002.  
Expansionary or contractionary. Provide the economic reasons for the answers.
6. Derive private sector saving  $S_p$

### Question 3 :Fiscal Policy

Using the following model with 3 equations to answer the questions

- (1)  $Y = C + I + G + X - M$
- (2)  $C = C_0 + c YD$
- (3)  $YD = Y - T$

1. The government wants to increase aggregate demand to stimulate the economy but does not want to change the fiscal balance, meaning that the increase in  $G$  and in  $T$  is the same. Can the government achieve this.
2. What is the resulting increase in the amount of aggregate demand, and interpret the result economically

**Question 4: Monetary Policy**

1. What is the real interest rate, if GDP grows by 5 % , broad money by 14%, the nominal interest rate is 15%, and velocity is constant .
2. A country is experiencing an increase in the rate of inflation. What are the possible causes and what are the monetary instruments that may be used to reduce the rate of inflation.
3. (a) How does inflation affect retirees income.; (b) How does inflation affect bank loan in the medium term from the viewpoints of lenders and borrowers.

**Question 5: Experiment with policy and exogenous shocks**

This question aims at exploring the impact of selected policy measures and exogenous shocks on selected aggregates of a small and open economy. To anchor the framework of reasoning, (A) the economy is formalized in a model; (B) the base line is established to compute selected aggregates, and (C) this base line is compared with the outcomes of impact on the economy of selected policy measures and exogenous shocks.

**A. The model**

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2



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 2

Assume an economy described by the following equations:

- (1)  $Y = C + I + G + X - M$
- (2)  $X - M = NX$
- (3)  $Y = 100$
- (4)  $G = G_0 = 20$
- (5)  $T = T_0 = 20$
- (6)  $I = 20 - r$
- (7)  $C = 5 + 0,8(Y - T)$
- (8)  $NX = 10 - 10e$
- (9)  $r = r^* = 5\%$

Note:

National saving:  $S = S_p + S_g$

External current account balance =  $NX = X - M$

$e$  = the real exchange rate

$r$  = domestic interest rate;  $r^*$  = world interest rate

**B. The base line**

1. Compute:

- a. National saving
- b. Investment

- c. External current account balance; and
- d. Equilibrium real exchange rate.

### C. Impact of policy measure and exogenous shock

2. What is the impact of an expansionary fiscal policy on the economy. Assume that expansionary fiscal policy is represented by an increase in  $G$  to 25.

Impact on the economy means: (a) the numerical outcomes for selected aggregates; and (b) the direction of changes of those aggregates following implementation of policy measures and exogenous shock. To determine the direction of changes, compare the outcomes of selected aggregates in this question to those in the base line. Provide the numerical answers and the reasoning underlying the changes.

- e. National saving
- f. Investment
- g. External current account balance; and
- h. Equilibrium exchange rate.

3. What is the impact on the economy of an increase in world interest rate from 5% to 10%;  $G = 20$ . As in preceding question, provide the numerical answers and the reasoning underlying the changes.





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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 2

- i. National saving
- j. Investment
- k. External current account balance; and
- l. Equilibrium exchange rate.

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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 3

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Problem Set 3**

**Due date: 8:20 a.m., October 10, 2005**

**Monetary Policy**

1. Refer to the Statistical Appendix ( SA ) on Vietnam, use data in tables 17 , 18 and 19, representing the monetary survey, the central bank, and the consolidated accounts commercial banks, to answer the following questions.

- a. Find how the absolute numbers for 2002 in table 17: Vietnam. Monetary survey have been derived from tables 18 and 19. For this, give a symbol to each item in the balance sheet of the central bank (cb) and the commercial banks (cob), use those symbols to write the formula for each item in the monetary survey, replace the symbols by their values and compare the results with the actual number in table 17. Example :  $FA_{cb} + FA_{cob} = FA = 65.2 + 70.7 = 135.9$ .
- b. What is the difference between currency in circulation and currency outside banks. What is the value of currency in the vaults of all banks .
- c. Write the formulae for the velocity of money and compute it for 2002. Give the possible reasons why the velocity of money remained the same in 2001 and 2002.

- d. Provide the economic reasons for the increase in broad money in 2002 (17.6%)..
  - e. (a) Compute the rate of inflation for 1998-2002, using  $MOQ.V = P.Y$ ; (b) compare the results with the actual rate of inflation; (c) explain the possible causes for the difference.
  - f. What are the possible causes of the inflation rate of 4% in 2002. Provide the empirical evidence for each cause.
  - g. Suppose that statutory ( legal) reserve requirements are 7 % of total deposits of commercial banks. Did commercial banks hold any excess reserves in 2002 ( Use banks reserves in SA table 19.
  - h. To stabilize the price levels, the central bank sells VND10 billion to commercial banks. Show the changes in: (i) the balance sheet of the central bank; ( ii) the consolidated balance sheet of the commercial banks; and (iii) the monetary base. Provide the economic reasoning underlying those changes.
2. The average nominal interest rate in the US is 3 % and in Vietnam 8%. A business plan is proposed whereby one borrows US dollars from the US and put it in VND account in Vietnam. Discuss the conditions for this business to generate profits after one year of deposits.

### **Fiscal policy**

3. Given the model

$$(1) Y = C + I_o + G_o + X_o - M_o$$

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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 3

$$(2) C = C_0 + c(Y - T)$$

$$(3) T = T_0 + tY$$

$$(4) FB = T - G_0$$

where variables with subscript zero (=0) are given and  $0 < c$  or  $t < 1$ ;

a. Show by formula and explain by words why  $t$  may be considered an automatic stabilizer.

b. Show that an increase in the fiscal deficit may not necessarily indicate any discretionary action by the government to raise that deficit. [ Hint: Compare  $FB_1$  and  $FB_2$  corresponding to  $Y_1 > Y_2$

To help you to better apprehend the reasoning, you may take the following numerical values  
 $I_0 = G_0 = X_0 = M_0 = T_0 = C_0 = 20$ ,  $c = 0.8$ , and  $t = 0.2$

### Money and exchange rate

4. Non US countries have bought large amount of US bonds. The Economist (September 5, 2005, p 70) wrote:

*If the central banks [of non-US countries] lost their appetite [for US bonds], the dollar could tumble while [US] interest rates rose.*

Please explain.

### IS-LM and Policies

5. Assume an economy is described by the following equations:

- (1)  $Y = C + I + G$
- (2)  $C = 5 + 0.8(Y - T)$
- (3)  $I = 20 - r$
- (4)  $G = G_0 = 20$
- (5)  $T = T_0 = 20$
- (6)  $M_0/P = 20$  and  $P = 1$
- (7)  $L(r, Y) = 0.2Y - 0.2r$

- a. Derive the IS equation and determine slope of the IS curve.
- b. Derive the LM equation and determine slope of the LM curve.

Draw the IS and LM curves to experiment with the following situations. Note that the changes in the selected aggregates in each question are relative to the initial model, changes from one question do not carry to the subsequent questions, unless otherwise indicated.

- c. Determine the equilibrium income (output) (Y), equilibrium interest rate (r), consumption (C), investment (I) and national savings that satisfy the equilibrium in both the goods and the money markets.
- d. If an economy is in recession as the Vietnam economy in 1999, the government may want to increase income by raising aggregate demand through increasing its expenditure. Suppose the government increase G by 2, (i.e.,  $G = 22$ ), will the IS curve shift down to the left or up to the right and how much. How are Y, r, changed and provide intuitive explanations for those changes.

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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 3

- e. If an economy is in recession as the Vietnam economy in 1999, the government, may alternatively, want to increase income by reducing  $T$  by 2 ( .  $T = -2$ ), will the IS curve shift down to the left or up to the right and how much. How are  $Y$ ,  $r$ , changed and provide intuitive explanations for those changes.
- f. Inflation tends to rise, as in Vietnam in 2005, one policy alternative to cut the inflation rate is to reduce the money supply  $MOQs$ . (i) Indicate the instruments the government may use to reduce the money supply; (ii) If  $M$  is reduced by 2, ( .  $M = -2$ ), will the LM curve shift down to the right or up to the left and how much. How are  $Y$ ,  $r$ , changed, and provide intuitive explanations for those changes.

### Overall Analysis

6. In the second half of September 2005, banks in Vietnam increase the nominal interest rates on their lending. Trace qualitatively the first round and the second round impacts of this action on the economy of Vietnam.

This means one has to indicate clearly the impacts on selected economic objectives--namely GDP, inflation, and net foreign assets and other relevant aggregates. Indicate the direction of change of each aggregate and provide a short explanation why that change takes place.

*Hint: Trace those impacts through the equations representing the real, fiscal, monetary and the external sectors, the quantity equation, the Fisher equation, and the relations between the real, nominal, exchange rate and domestic and foreign prices.*

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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

**Fulbright Economics Teaching Program  
Fall Semester, 2005  
MACROECONOMICS**

**PROBLEM SET 4**

*Distribution Date: Tuesday, October 4, 2005*

*Due Date: Tuesday, October 11, 2005*

Whenever relevant, write down the basic equations on which you base your reasoning for answering the questions.

**Exchange rate**

**Question 1**

When the real exchange rate decreases net exports (or the external current account) increase. Is this correct. Explain your answer.

**Question 2**

The equilibrium real exchange rate of the VND is obtained when the supply of VND available from the net inflows of capital is equal to the demand for VND by foreign buyers of Vietnam net exports. Is this correct. Explain your answer

**Question 3**

In 2004, the fiscal deficit of Vietnam as a percentage of GDP increased relative to 2003. What could have been the effect of this apparent expansionary fiscal policy on the real exchange rate. Explain your answer.

#### Question 4

Given the value of the real exchange rate  $e$ ,

- a. If the domestic price level in VN rises, the nominal exchange rate of VND,  $e$  falls. Is this correct. Explain your answer
- b. If the foreign price  $P^*$  (non- US prices) rises, the nominal exchange rate of VND, rises. Is this correct. Explain your answer.
- c. In 2004, it was estimated that broad money stock broadly increased by 26% and real GDP increased by 7 %. What is the likely effect of an increase of money supply on the nominal exchange rate. Explain the mechanism of transmission from increase of money supply to the change in the nominal exchange rate. Mechanism of transmission, in this context, means the chain of causes-effects from the initial action to the final outcome.



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

### Question 5

An expansion in fiscal policy tends to cause an increase in the external current account deficit, an equivalent net inflow of capital and an appreciation of the exchange rate. Is this correct. Explain your answer.

### Mundell-Fleming Model

### Question 6

If a small country has perfect capital mobility, domestic interest  $r$  is equal world interest rate  $r^*$ , which is  $r^* = r$ . With this definition of a small economy, is Vietnam a small economy. Why.

### Question 7

In a small economy, and under floating exchange rate,

- a. A monetary expansion increases incomes and lowers the exchange rate. Is this correct. Explain your answer.
- b. A fiscal expansion does not have any effect on income but raises the value of the exchange rate. Is this correct. Explain your answer.
- c. Does the Vietnam economy fit this model. Explain your answer.



**Question 8**

In a small economy, and under fixed exchange rate,

- a. A monetary expansion does not have any effect on income, exchange rate. Is this correct. Explain your answer.
- b. A fiscal expansion raises income and does not have any effect on the exchange rate. Is this correct. Explain your answer.
- c. Does the Vietnam economy fit this model. Explain your answer.

**Question 9**

A country does not have any restriction on its capital movements, its domestic interest should be equal to the world interest. But in actuality, they are different. Why.

**Aggregate supply**



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

### Question 10

In the Vietnam economy, wages are sticky.

- a. If nominal wage is fully indexed to the CPI, meaning that nominal wage is fully adjusted to compensate for the change in the CPI. How does a full indexation alter the aggregate supply curve.
- b. How does a partial indexation alter the aggregate supply curve.





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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 5

**Fulbright Economics Teaching Program  
Fall Semester, 2005  
MACROECONOMICS**

**PROBLEM SET 5  
Due Date: October 18, 2005**

**Question 1: Explaining concepts and facts**

- 1) The Solow growth model predicts that per capita incomes among countries in the world will tend to converge. Explain briefly why in reality per capita income gap between rich countries and poor countries is not closing.
- 2) What is Solow residual. How is this residual in relation to knowledge and innovation.
- 3) Today, economists recognize that knowledge plays important role in economic growth, the dissemination of knowledge will help create spillover effects and increase total factors of production (TFP). Yet, the transfer of knowledge has raised social benefits considerably compared to own market value. This beneficial difference can discourage future knowledge creation. What are solutions to this externality in order to give incentive to new knowledge development. Explain your reasoning.

**Question 2: Growth model**

- 1) You are asked to study the development of country IRA. You decide to use a simple Cobb Douglas production function. The exponents of this function are determined by regression method. The function is:

$$Y = K^{1/2} L^{1/2}$$

- a) Derive per-worker production function  $y = f(k)$ .
  - b) Calculate output per worker against each level of  $k = 1, 4, 9, 16, 25$ .
  - c) Draw a graph for per-worker production function.
- 2) Your next task is to study IRA economy in 2004 and you come up with the following information: (1) an average IRA citizen saves 30% her income, (2) each year capital stock depreciates 10% during production, (3) there are 4 million workers in IRA and there seems no increase in the amount of labors, your computing unit is million workers ( $L = 4$ ), (4) capital stock is 16 million dollars with computing unit in million ( $K = 16$ ). Technology level in IRA has not changed. Based on the information, calculate:
- a) Amount of capital per worker ( $k$ )
  - b) Output per worker ( $y$ )
  - c) Average savings per worker ( $sy$ )





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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 5

- d) Average consumption per worker  $(1-s)y$
  - e) Gross and net capital investment per worker (i)
  - f) Draw a graph of per-worker production function to illustrate IRA economy in 2004.
- 3) In your calculation, you explain to the government that when capital stock per worker grows, the increase in output per capita is lower. It is because of diminishing marginal product of capital. When output per worker decreases, so does saving per worker. At some points, the additional increase in output per worker will generate just enough investment per worker to offset depreciation. At this point, the economy reaches the steady state. You have to prepare data at this steady state and present to the IRA government, including:
- a) Capital stock and amount of capital per worker
  - b) Real GDP and output per worker
  - c) Total consumption and consumption per worker
  - d) Total investment and gross investment per worker
  - e) Share of capital per worker in income
  - f) Capital growth rate, capital accumulation per worker, real GDP and output per worker
- 4) Now the chairman of IRA Economic Advisory Committee is not satisfied with real GDP growth rate at the steady state (equilibrium). In his opinion, at this steady state, the rate should be higher if saving rate is growing from 30 to 40%. Assess this proposal. In

doing so, you need to calculate again the variables in question 3 at 40% saving rate.

- 5) The president of IRA sets forth long term objective that is raising living standards via maximizing consumer future consumption. He believes that he can persuade the public to change their saving habits, giving up part of their current consumption to future generation. What left is should savings be raised or lowered and how much. You have to help him determine the economy optimal saving level.
- 6) To increase growth, the chairman of IRA Economic Advisory Committee allows net labor immigrants of 10% labor force. Based on this new assumption, re-calculate variables in questions 3 and show whether this proposal is beneficial to the economy. Should IRA government accept this proposal. For an informed decision, consider the following issues:
  - a) Does an increase in the labor force lead to increase in growth rate.
  - b) Does an increase in the labor force help improve living standards.

### **Question 3: Economic growth policy**

- 1) In the 1990s, Vietnam was among countries with highest growth rates in the world. Why would Vietnam have such high growth rate. What is your assessment on policy and institution reform in this period.



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 5

- 2) Based on the convergence hypothesis, what is your prediction on per capita income growth rate before reaching equilibrium and the steady state without any change in institution and policy.
- 3) New growth models focus on the importance of creating a supportive environment for firm and individual innovation, whether it is done by increasing spending on R&D to produce new products, by transferring or copying advanced technologies from other countries, or by upgrading knowledge and skills. Based on these growth models and with real life evidence, determine what kind of key reform that Vietnam needs to have in order to maintain a sustainable growth rate in the future.

#### Question 4: Exchange rate policy

1. **Reviewing the economic developments in Vietnam for period 2000-03, an international financial organization made some recommendations regarding the exchange rate policy ( see paragraph 69, Bao cao tham van theo Dieu IV nam 2003, cua IMF doi voi Vietnam, [SR2003]. These recommendations were:**
  - a. The managed float is appropriate for Vietnam;
  - b. It should be implemented with more flexibility;
  - c. The central bank has appropriately increase its foreign reserves; and

- d. The central bank should be more active in sterilize the impact of its purchases on bank liquidity.

Explain why those recommendations were made. For this task and for each recommendation,

- a. Identify and analyze the issues (see, for example, SR 2003, para. 15-17; 30-40 and especially paras 39-40); and
- b. The reasons for making the recommendations.

For each question (a) and (b), answer concisely, and only 3 lines are allowed..

2. During an interview with the E-news VNexpress on Oct. 5, 2005, SBV governor Le Duc Thuy said:

*Foreign reserve of the SBV increased fairly fast. That means there is no problem with supply and demand and it can be said that the current exchange rate is relatively reasonable.*

This is a way of addressing the public. Yet if the governor audience was FETP participants, Mr. Governor would speak in a specific manner. Should you were the governor, how would



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 5

you explain the statement the current exchange rate is relatively reasonable. In your opinion, is actual exchange rate in equilibrium.

### **Question 5: Aggregate supply and unemployment**

1. Unanticipated increase in the money supply affects real GDP. Is this true and why.
2. A participant in FETP 11 states that: I can predict accurately the future prices and wages, if all persons in Vietnam are like me, monetary policy is irrelevant Is this true and why.
3. Indicate the best policy for Vietnam to minimize the potential increase in unemployment due to an increasing globalization of the economy, which will induce unexpected changes in the composition of demand among industries. Why.

Van Can/QuangHung/QuyTam

4

10/27/2005





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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Problem set 1 Solution**

**Question 1:**

Flow variables vs. stock variables.

**Answer:**

Flow variables

- 1) Income of a worker
- 2) Total investment in an economy
- 3) Government saving

Stock variables

- 4) Wealth of the worker
- 5) Total money in an economy
- 6) Real estate value in HCMC

**Question**

**Question**

The newly established Croatia this year wants to publish data on its national accounts. Yet, Croatian economists face difficulties in conducting study and computing key aggregates. Let help them fulfill this task.

**Data (in Croatia dollar)**

|                            |        |
|----------------------------|--------|
| Consumption expenditure    | 80,000 |
| Income from leasing assets | 2,000  |
| Net Factor Service         | -4,000 |
| Government spending        | 15,000 |
| Indirect tax               | 2,000  |
| Profit                     | 18,000 |
| Capital depreciation       | 6,000  |
| Net investment             | 12,000 |
| Exports                    | 30,000 |
| Wages and Salaries         | 70,000 |
| Imports                    | 35,000 |
| Interest payment           | 10,000 |
| Direct tax                 | 10,000 |
| Grants                     | 5,000  |

Compute the following aggregates:



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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

- 1) GDP and GNP at market price using expenditure and income approaches
- 2) Disposable national and individual incomes (YD and GNDI)
- 3) Sp, Sg, and total domestic saving.
- 4) Compare (S-I) and (X-M)

**Answer:**

- 1) GDP and the expenditure approach (net and market price)
 
$$\text{GDP} = C + I + G + X - M$$

$$\text{GDP} = 80,000 + 15,000 + 12,000 + 6,000 + 30,000 - 35,000 = 108,000$$
 GDP and the income approach
 
$$\text{GDP} = w + i + R + \pi + De + NTe$$

$$\text{GDP} = 70,000 + 10,000 + 2,000 + 18,000 + 6,000 + 2,000 = 108,000$$

$$\text{GNP} = \text{GDP} + FS_n = 108,000 + (-4,000) = 104,000$$

$$\text{NI} = \text{GNP} - NTe - De = 104,000 - (6,000 + 2,000) = 96,000$$
- 2) Disposable national and individual incomes
 
$$\text{NI} = 104,000 - 2,000 - 6,000 = 96,000$$

$$\text{GNDI} = \text{GNP} + \text{GRANT} = 104,000 + 5,000 = 109,000$$
 Domestic savings
 
$$S = \text{GDP} - C - G = 108,000 - 80,000 - 15,000 = 13,000$$

$$S - I = 13,000 - (12,000 + 6,000) = -5,000 \quad (1)$$

$$X - M = 30,000 - 35,000 = -5,000 \quad (2)$$

Compare (1) and (2)

$$S - I = X - M$$

### **Question 3:**

A hypothetical economy has only 3 production units a) wheat ; b) wheat powder and c) bread. Suppose in 2004, wheat production unit sold 4/5 of its output value to the powder unit and stored the rest 20 as inventory. The powder unit, in turn, sold 100 output valued to the bread unit and increased its inventory by 30. The bread unit sold its 500 output value to final consumers. Calculate GDP in 2004, assuming that the wheat production unit did not purchase inputs.

#### **Answer:**

$$GDP = VA \text{ wheat} + VA \text{ wheat powder} + VA \text{ bread}$$

$$VA \text{ wheat} = 5 \cdot 20 = 100$$

$$VA \text{ wheat powder} = (100 + 30) - 80 = 50$$

$$VA \text{ bread} = (500 - 100) = 400$$



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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

$$\text{GDP} = 100 + 50 + 400 = 550$$

**Question 4:**

Suppose Croatia produces consumer goods that have prices and quantity given in the table below:

| Products       | 2000 Quantity       | 2000 Price (Thousand dong) | 2000 Quantity       | 2003 Price (Thousand dong) |
|----------------|---------------------|----------------------------|---------------------|----------------------------|
| Video          | 1 unit              | 1,000                      | 120 unit            | 800                        |
| Electric power | 500 kwh             | 0.5                        | 1,000 kwh           | 0.7                        |
| Food           | 200 tons            | 2                          | 500 tons            | 3                          |
| Gas            | 100 cm <sup>3</sup> | 100                        | 200 cm <sup>3</sup> | 120                        |

Problems:

- Using the year 2000 as the base year, compute nominal and real GDP in 2004.
- The GDP deflator (Paasche index) in 2000 and 2004.
- The fixed-weight price index CPI (Laspeyres index) in 2000 and 2004
- Using the two indices to calculate growth rate of price level from 2000 to 2004.  
Explain why the resulting growth rates of price level are different for these two



indices  
in

**Answer:** calculation.

- a) Year 2000 as the base year

$$\text{Nominal GDP (2004)} = 120 \cdot 800 + 1,000 \cdot 0.7 + 500 \cdot 3 + 200 \cdot 120 = 122,200$$

$$\text{Real GDP (2004)} = 120 \cdot 1,000 + 0.5 \cdot 1,000 + 2 \cdot 500 + 100 \cdot 200 = 141,500$$

- b) GDP deflator (2000) = 100 (as the base year is 2000)

$$\text{GDP deflator (2004)} = \frac{\text{nominal GDP}}{\text{real GDP}} \cdot 100 = \frac{122,200}{141,500} \cdot 100 = 86.36$$

- c) CPI (2000) = 100 (as the base year is 2000)

$$\text{CPI (2004)} = \frac{800 \cdot 100 + 0.7 \cdot 500 + 3 \cdot 200 + 120 \cdot 100}{1000 \cdot 100 + 0.5 \cdot 500 + 2 \cdot 200 + 100 \cdot 100} \cdot 100 = 84$$

- d) Growth rate of price level from 2000 to 2004 by Passche index

$$\text{Deflation rate} = \frac{(86.36 - 100)}{100} \cdot 100 = -13.64\%$$

- e) Growth rate of price level from 2000 to 2004 by Laspeyres index

$$\text{Deflation rate} = \frac{(84 - 100)}{100} \cdot 100 = -15.9\%$$

There is difference between the resulting growth rates of the price level as we used the two indices in calculation because their calculations are different. In the Passche



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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

index, the weight of price index is changing every year, while in the Laspeyres index, the weight is fixed.

**Question 5:**

Explain how do the following transactions have any impact on Vietnam GNP. (increased, decreased, unchanged)

- a) Mrs. Lan sells the house that she bought 5 years ago
- b) Honda Vietnam imports a volume of spare parts from China
- c) Profit of ACER in HCMC, a 100% foreign owned company, increased by 10%
- d) Government increases subsidy for teachers in mountainous areas by 10%.
- e) In 2004 Huy Hoang Trading Company imported a 100-billion dong container of goods, 80% of which were sold out during the year.
- f) A Dutch tourist had haircuts in HCMC

**Answer:**

- a) This does not affect Vietnam GNP because it is not income generated during the year. However, if selling the house implies a provision of current services, then GNP will increase.
- b) This does not affect Vietnam GNP because it is not income of Vietnam
- c) Again, no impact on Vietnam GNP because it is income of non-residents.
- d) The subsidy is not part of income therefore it is not accounted in GNP (it is unilateral transfer)

- transfer
- e) ~~in~~ ~~is~~ ~~not~~ ~~affect~~ Vietnam GNP because it is not income of Vietnam. However, as in question (a) if this implies a provision of current services, then it will increase GNP.
- f) This means an amount of income is created by a Vietnamese hairdresser, so it will be calculated in GNP.

**Question 6:**

A hypothetical closed economy is presented by the following set of equations:

Supply side

- a. Production function  $Y = L^{0,5} K^{0,5}$
- b. Resource constraints  $L = 200 \quad v \quad K = 50$

Demand side

- c. Household consumption function  $C = 10 + 0,85.(Y-T)$
- d. Investment function  $I = 20 - 2r$
- e. Government Expenditure  $G = 20$
- f. Tax  $T = 20$

Problems:

- 1) Determine national income, real wage, real rental prices of capital and labor; income distributed to capital and labor
- 2)  $S_p$ ,  $S_g$ , and national saving



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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

- 3) Determine equilibrium real interest rate in capital market
- 4) Show changes in national income, real wage, real rental prices of capital and labor when:
  - a. Government spending on national security increased to 2
  - b. Due to tax credit policy, investment increased by 10%
  - c. Tax reform resulted in 10% increase in revenue
  - d. Free migration raised labor force by 10%

**Answer:**

- 1) Determine national income, real wage, real rental prices of capital and labor; income distributed to capital and labor

National income

$$Y = L^{0.5} K^{0.5} = (200)^{0.5} (50)^{0.5} = 100$$

Real wage

$$\frac{W}{P} = MPL = \frac{\partial Y}{\partial L} = 0.5 L^{-0.5} K^{0.5} = 0.5 \left(\frac{K}{L}\right)^{0.5} = 0.5 \left(\frac{50}{200}\right)^{0.5} = 0.25$$

Real rental price of capital

$$\frac{R}{P} = MPK = \frac{\partial Y}{\partial K} = 0.5 L^{0.5} K^{-0.5} = 0.5 \left(\frac{L}{K}\right)^{0.5} = 0.5 \left(\frac{200}{50}\right)^{0.5} = 1$$

Income distributed to labor

$$\left(\frac{W}{P}\right) L = 0.25 \cdot 200 = 50$$

Income

income  
distributed  
to  $\left(\frac{K}{P}\right) K = 1 \cdot 50 = 50$   
capital

2)  $S_p$ ,  $S_g$ , and national savings

$$S_p = Y - C - T = 100 - [10 + 0.85(100 - 20)] - 20 = 2$$

$$S_g = T - G = 20 - 20 = 0$$

$$S = S_p + S_g = 2 + 0 = 2$$

3) Equilibrium real interest rate

$$S = I(r)$$

$$2 = 20 - 2r$$

$$r = 9\%$$

Real interest in capital market is 9 (%)

Investment when the economy is in equilibrium:

$$I = 20 - 2r = 20 - 2 \cdot 9 = 2$$

4) Simulation

a)  $G = 2$ , national income, real wage and real rental price of capital are not affected,  
real interest increases due to reduction in savings

$$S = S_p + S_g = 2 - 2 = 0$$

Equilibrium Real Interest Rate

$$S = I(r) \quad 0 = 20 - 2r = 0 \quad \therefore r = 10\%$$





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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

- b)  $I$  by 10%, national income, real wage and real rental price of capital are not affected  
real interest  $r$  as  $I$  (holding the assumption that  $I$  does not affect  $K$ )

autonomous investment 10%

$$I = 20 + 0.1 = 20.1$$

The new investment function

$$I = 20.2 - 2r$$

Equilibrium Real interest rate

$$S = I(r) \quad 20 = 20.2 - 2r \quad r = 9.1 (\%)$$

- c) When tax revenue increases 10%, national income, real wage and real rental price of  
capital are not affected real interest  $r$  as  $S$

Revenue after 10% increase in tax

$$T = T(1+0.1) = 20(1+0.1) = 22$$

National savings after 10% increase in tax

$$S = Y - C - G = 100 - (10 + 0.85(100-22)) - 20 = 3.7$$

Equilibrium Real interest rate

$$S = I(r) \quad 3.7 = 20 - 2r \quad r = 8.2 (\%)$$

- d) Labor increase 10% . national income, . real rental price of capital but real interest and real wage .

Labor stock

$$L = L(1+0.1) = 200(1+0.10) = 220$$

National income

$$Y = L^{0.5} K^{0.5} = (220)^{0.5} (50)^{0.5} = 104.8$$

Real wage

$$\frac{W}{P} = MPL = \frac{Y}{L} = 0.5L^{-0.5}K^{0.5} = 0.5\left(\frac{K}{L}\right)^{0.5} = 0.5\left(\frac{50}{220}\right)^{0.5} = 0.24$$

Real rental price of capital

$$\frac{R}{P} = MPK = \frac{Y}{K} = 0.5L^{0.5}K^{-0.5} = 0.5\left(\frac{L}{K}\right)^{0.5} = 0.5\left(\frac{220}{50}\right)^{0.5} = 1.05$$

Income distributed to labor

$$\left(\frac{W}{P}\right) L = 0.24 \cdot 220 = 52.8$$

Income distributed to capital

$$\left(\frac{R}{P}\right) K = 1.05 \cdot 50 = 52.5$$

National savings

$$S = Y - C - G = 105 - (10 + 0.85(105 - 20)) - 20 = 2.75$$

Equilibrium Real interest rate

$$S = I(r) \quad . \quad 2.75 = 20 - 2r \quad . \quad r = 8.62 (\%)$$



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Academic year 2005-2006

Macroeconomics

Problem Set 1 Solution

**Question 7:**

From the data of IFS-MF or the General Statistics, construct a set of consistent data on Vietnam aggregates during 1996-2004 and (a) write a report describing difficulties and how you overcome these difficulties as you construct the data; and (b) discuss trends in the economy. Required economic aggregates include:

- 1)  $GDP_m$ ,  $GDP_f$  and GNP
- 2)  $FS_n$ , indirect tax
- 3) Value added in industry, agriculture and service
- 4) Net transfer from abroad, exports and imports of goods and services
- 5) Balance of current account, capital account and official aids
- 6) Consumption (private and government)
- 7) Private investment  $I_p$  and government investment  $I_g$
- 8)  $S_p$  and  $S_g$
- 9) Domestic saving and total national saving
- 10) Government revenue and expenditure, sources of financing

**Answer:**

This is an open question, it is up to students understanding of the issue (grading will be based on explanation)

on relative  
comparisons among  
answers).



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Academic year 2005-2006

Macroeconomics

Solution 2

**MACROECONOMICS 2005**  
**SUGGESTED SOLUTION TO PROBLEM SET 2**

Write short answers in a few short sentences

Data for questions on Vietnam for 2002 are to be obtained from tables that were already distributed).

For all numerical questions, use symbols first to derive answers, and replace symbols by their numerical values to obtain numerical answers.

**Question 1**

Suppose that  $GDP=Y$  is defined as:

$$Y = C + I + G + X - M$$

C= final consumption of goods and services

I= Investment

G= government expenditure

X= exports of goods and services

M= imports of goods and services

Such a definition may be found in Mankiw, chapter 5, p.116

Referring to the System of National Accounts (SNA, 1993) as discussed in class, assess critically this definition.

1. If the above definitions for X and M are maintained, what would be Y equal to. Why.

*Answer*

*Y would be equal to GNI (Gross National Income)*

*Reasons:*

*Services in X and M as above defined, include both factor and nonfactor services.*

*Since factor services are included in X and M, the Y in the above equation should be construed as GNI.*

***Formally:***

*In (1) above*

*X = exports of goods and services = exports of goods + exports of nonfactor services + exports of factor services*

$$X = XG + XS = XG + XNFS + XFS$$





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Academic year 2005-2006

Macroeconomics

Solution 2

*Imports of goods and imports of services = Imports of goods + imports of nonfactor services + imports of factor services*

$$M = MG + MS = MG + MNFS + MFS$$

*Equation (1) may be written fully as:*

$$(2) Y = C + I + G + (XG + XNFS + XFS) - (MG + MNFS + MFS)$$

*However, according to SNA,*

$$(3) GDP = C + I + G + (XG + XNFS) - (MG + MNFS)$$

*The right hand side of (2) may be rearranged as:*

$$(3) [C + I + G + (XG + XNFS) - (MG + MNFS)] + (XFS - MFS) = GDP + (XFS - MFS) = GDP + FS_n = GNI$$

2. If Y is maintained as GDP, what definitions should be given to X and M. why .

***Answer:***

***If Y in (1) is GDP, services in X and M should be defined as including only exports and imports***

of  
 nonfactor  
**Question 2**

With available data for Vietnam 2002, compute:

*Objective: to show in real situation, data may be incomplete, inconsistent. Adjustment in data may be made in light of other available information to derive a consistent set of data to explain developments in the economy.  
 Give full credit to anyone of the solution.*

1. Saving S

*Two possible ways to compute (due to multiple sources).*

*a. From Statistical Appendix SA2003, table1, p. 4 ( in trillions of VND)*

$$S = GDP - C_p - C_g = 536.1 - 348.1 - 33.4 = 154.6$$

*As % of GDP:*

$$S = 154.6 / 536.1 = 28.8\%$$

*b. From SR2003, table 2, p. 31*

$$S = 25.6\% \times GDP = 25.6\% \times 520.4 = 133.2$$



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Academic year 2005-2006

Macroeconomics

Solution 2

## 2. Investment I

*Two possible ways to compute (due to multiple sources).*

*a. From Statistical Appendix SA2003, table1, p. 4 ( in trillions of VND)*

$$I = \text{Gross} + \text{change in stocks} = 160.8 + 11.2 = 172.0$$

*As % of GDP:*

$$I = 172.6 / 536.1 = 27.2\%$$

*b. From SR2003, table 2, p. 31*

$$I = 27.2\% \times \text{GDP} = 27.2\% \times 520.4 = 141.6$$

3

a. External current account balance CA ( in millions of US \$) (SR2003, Table 3, p 32)

$$\begin{aligned} \text{CA} &= X - M + \text{NFSn} + \text{FSKn} + \text{FSLn} + \text{GRT} \\ &= 16706 - 17581 - 648\,766 + 0 + 1898 = -391 \text{ (-1.1 \% GDP)} \\ \text{In VND, CA} &= -391 \times 15\,244/10 \text{ exp } 6 = 6 \text{ trillions} \end{aligned}$$

b Provide the economic reasons for such a balance.

*The external current account worsened from a surplus of 2.2% of GDP in 2001 to a deficit of 1.1 % in 2002 (SR2003. Table 2. v. 31). The*

*... (continued) ...*  
*direction in the short run to increase in investment and consumption which boosted imports substantially despite continued increase in exports.*

4.

a. Verify:  $S - I = CA$  ( data from SR2003)

In absolute numbers (trillions of VND)

$$S I = 133.2 - 141.6 = -8.3 = X - M + \text{discrepancy} = -6.0 + 2.3 = -8.3$$

In percent of GDP:

$$S - I = 25.6 - 27.2 = -1.6 = X - M + \text{discrepancy} = -1.1 + -0.5 = -1.6$$

b. Explain how the saving-investment gap was financed.

*The saving-investment gap was financed by inflows of capital equal to +\$391 million.*

$$BOP: CA + CF = 0$$

$$CA = -391$$

$$CF = FDI + Dg + Dp + EO + DNFA = 391$$

$$FDI = FDI_{\text{gross}} + FDI_{\text{repayments}} = +1100 - 414 = +686$$

$$Dg = ODA + \text{commercial loans} - \text{Amortization} = 487 = 1020 + 56 - 590$$



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Academic year 2005-2006

Macroeconomics

Solution 2

$$Dp = 0$$

$$CFO = \text{short term capital net} = 628$$

$$DNFA = -464$$

$$EO = \text{errors and omissions is a residual} = -(CA + FDI + Dg + Dp + DNFA) \\ = -(-391 + 686 + 487 + 628 - 464) = -(946)$$

5.

a. Fiscal balance FB

### Answer

$$FB = \text{Total revenue and grants} - G$$

$$\text{In VND trillions: } FB = 119 - 128.9 = -9.9 \text{ (SA table 13, p 16)}$$

$$\text{In percent of GDP: } FB = 22.9 - 24.8 = -1.9 \text{ (SR2003, table 5, p. 34):}$$

b. What may be the stance of fiscal policy in 2002. Expansionary or contractionary.  
Provide the economic reasons for the answers.

*Fiscal policy in 2002 appeared to continue with its expansionary stance, albeit somewhat abated in relation to 2001 (with a deficit of 2.2% of GDP).*



6. Derive private sector saving  $S_p$

*In VND trillions*

$$S = S_p + S_g = S = 133.2$$

$$S_p = S - S_g = 133.2 - (-9.9) = 143.1$$

*In percent of GDP*

$$S_p = 25.6\% - (-1.9\%) = 27.5\%$$

*$I = S_p + S_g - (X-M)$  discrepancy*

$$27.2 = 27.5 - 1.9 - (-1.1) - (-0.5)$$

*In 2002, investment was financed mainly by domestic saving of the private sector*

### **Question 3 :Fiscal Policy**

Using the equations to answer the questions

$$(1) Y = C + I + G + X - M$$

$$(2) C = C_o + c YD$$

$$(3) YD = Y - T$$



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Academic year 2005-2006

Macroeconomics

Solution 2

1. The government wants to increase aggregate demand to stimulate the economy but does not want to change the fiscal balance, meaning that the increase in  $G$  and in  $T$  is the same. Can the government achieve this.

**Answer**

*Yes, the government can achieve an increase in aggregate demand while keeping the fiscal balance unchanged, by increasing spending and tax by the same amount.*

*Given the fiscal balance  $FB = T - G$ , unchanged fiscal balance means an increase (change) in tax = increase (change) in government spending:  
 $dFB = dT - dG = 0$ ; thus  $\Rightarrow dT = dG$*

*After the government increases its spending by  $dG$  to be financed by an equal increase in taxation  $dT$ , the aggregate demand does not remain unchanged but it increases, because the increase in tax  $T$  induces a reduction in consumption  $C$  less than the increase in tax, due to an MPC less than 1.*

**Formally:**

*Put (3) into (2) and the resulting equation in (1), one has:*

$$Y = C_o + c(Y - T) + I + G + X - M = C_o$$

$$Y = cY + (1-c)G + CX - cM + G + I + X - M$$

$$Y = [1/(1-c)](Co - cT + G + I + XM)$$

$$(1.1) \quad Y = (Co - cT + G + I + XM);$$

where: is the multiplier and equal to  $= [1/(1-c)]$

Take changes (total differentiation) in (1.1):

$$(1.2) \quad dY = (dCo - cdT + dG + dI + dX - dM)$$

Since we are interested in the changes in  $T$  and  $M$ , we assume that  $Co$ ,  $I$ ,  $X$ ,  $M$  remain unchanged, thus  $dCo = dI = dX = dM = 0$

$$(1.3) \quad dY = (-cdT + dG)$$

Since:  $dT = dG$  and  $c < 1$ ; aggregate demand must increase

$$\Rightarrow dY > 0$$

2. What is the resulting increase in the amount of aggregate demand, and interpret the result economically



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Academic year 2005-2006

Macroeconomics

Solution 2

*The amount of aggregate demand is increased by the amount of increase in government spending  $dY = dG$ . This is the balanced budget result*

*Aggregate demand increases because the amount of spending pumped into the economy is higher than the amount of consumption that is reduced only by the MPC, following the increase in tax to finance the increased spending.*

$$dY = (-c dG + dG) = [(1-c) dG] = [1/(1-c)] [(1-c) dG];$$

$$dY = dG$$

#### Question 4: Monetary Policy

1. What is the real interest rate if GDP growth by 5 % , broad money 14%, and the nominal interest rate is 15%.

**Answer**

*We have :*

$$MOQ . V = P . Y$$

$$\%MOQ + \% V = \%P + \% Y$$

$$\%P = \%MOQ + \% V - \% Y$$

$$\text{Since } i = r + \% P \Rightarrow r = i - (\%MOQ + \% V - \% Y)$$

$$15\% (14\% +$$

-----  
 0 - 5% )=

15% 9% = A country is experiencing an increase in the rate of inflation. What are the possible causes and what are the monetary instruments that may be used to reduce the rate of inflation.

**Answer**

*Possible Causes:*

- *increase in money supply due to :*
- *increase bank credit to the government ( monetization of the fiscal deficit)*
- *increase bank credit to the private sector, increase in imported costs ( imported inflation) and validation of this increase by the central bank, meaning increase bank credit to meet the higher costs.*
- *increase in inflows of foreign capital*
- *reduction in the demand for money given unchanged money supply*
- *increase in the velocity of money due, for example to expected higher inflation.*

b. Monetary instruments that may be used to reduce the rate of inflation

**Answer**

*Reduction of money supply by:*





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Academic year 2005-2006

Macroeconomics

Solution 2

- *increasing reserve requirement*
- *selling bonds by the central to banks through open market operations*
- *raising the discount rate by the central bank*

3.

a. How does inflation affect retirees incomes.

*Answer:*

*Retirees incomes are usually pensions and these are fixed in nominal terms, inflation reduces the real values of pensions.*

b. How does inflation affect bank loan in the medium term from the viewpoints of lenders and borrowers.

*Answer:*

*The amounts of loan payments are usually fixed in nominal terms and the interest rates are usually fixed for the life of the loans.*

*Inflation higher than estimated inflation to compute the lending interest rate, reduces the real value of those payments*

*Borrowers tend to gain and lenders tend to lose, if the inflation rate after the loans are disbursed. is larger than the inflation rate estimated for the*

.....  
~~example of the~~ *interest*

### Question 5: Experiment with policy and exogenous shocks

This question aims at exploring the impact of selected policy measures and exogenous shocks on selected aggregates of a small and open economy. To anchor the framework of reasoning, (A) the economy is formalized in a model; (B) the base line is established to compute selected aggregates, and (C) this base line is compared with the outcomes of impact on the economy of selected policy measures and exogenous shocks.

A. The model

Assume an economy described by the following equations:

- (1)  $Y = C + I + G + X - M$
- (2)  $X - M = NX$
- (3)  $Y = 100$
- (4)  $G = G_0 = 20$
- (5)  $T = T_0 = 20$
- (6)  $I = 20 - r$
- (7)  $C = 5 + 0,8(Y - T)$
- (8)  $NX = 10 - 10e$
- (9)  $r = r^* = 5\%$



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Academic year 2005-2006

Macroeconomics

Solution 2

## B. The base line

1. Compute

### a. National saving S

*Rearrange (1) to obtain national saving which is equal to the amount of final output remained after final consumption by households (=the private sector) C and by the government G.*

*(1.1)  $(Y - C - G) - I = S - I = X - M = NX$ ; where*

*(1.2)  $S = (Y - C - G)$*

*Replace C in (1.2) with equation (7):*

$$S = Y (5 + 0,8 (Y - T)) - G = Y 5 - 0,8 (Y - T) - G = 100 - 5 - 0,8(100 - 20) - 20 = 11$$

### b. Investment

*Investment is negatively related to interest rate r which is equal to the world interest  $r^* = 5$*

$$(6) I = 20 - r = 20 - 5 = 15$$

c. External current account balance; and

*Since the difference between saving and investment is equal to the difference between exports and imports*

$$S - I = X - M = NX = 11 - 15 = -4$$

d. Equilibrium exchange rate.

*Using equation (8) to find the equilibrium exchange rate, which is the exchange rate that clears the foreign exchange market, which means that the exchange rate at which the supply of foreign exchange is equal to the demand of foreign exchange.*

$$(8) NX = -4 = 10 - 10e \Rightarrow e = -14 / -10 = 1.4$$

### **C. Impact of policy measure and exogenous shock**

2. What is the impact of an expansionary fiscal policy on the economy. Assume that expansionary fiscal policy is represented by an increase in  $G$  to 25 and  $Y = 100$ .

Impact on the economy means: (a) the numerical outcomes for selected aggregates; and (b) the direction of changes of those aggregates following implementation of policy measures and exogenous shock. To determine the direction of changes, compare the outcomes of selected aggregates in this question to those in the base line. Provide the numerical answers and the reasoning underlying the changes.



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Academic year 2005-2006

Macroeconomics

Solution 2

### Answer

Follow the same steps as above but with  $G = 25$

#### a. National saving

*Since government spending increases and other aggregates are not changed (except net exports, see below), saving is reduced.*

$$S = Y(5 + 0,8(Y - T)) - G = Y5 - 0,8(Y - T) - G = 100 - 5 - 0,8(100 - 20) - 25 = 6$$

#### b. Investment

*Since  $r$  does not change, investment remains unchanged as in the base line*  
 $I = 15$

#### c. External current account balance

*Higher government spending leads to lower saving and given unchanged investment, the saving-investment gap increases, mirroring in the deterioration in net exports.*

$$S - I = XM = NX = 6 - 15 = -9$$

#### d.

---

Equilibrium

The deterioration in net exports is induced by an appreciation in the exchange rate.

$$NX = -9 = 10 - 10e \Rightarrow e = -19 / -10 = 1.9$$

**Summary:** *The increase in government expenditure reduces saving. Since the interest rate remains unchanged, investment also remains unchanged. But because of the reduction in saving, the gap S-I increases (from -4 to -11), which has to be financed by capital inflows. Capital inflows (+11) imply that net exports have to deteriorate (-11, which is equal to the S-I gap), for this to happen, the exchange rate has to appreciate (from 1.4 to 2.1).*

Question 3. What is the impact on the economy of an increase in world interest rate from 5% to 10%;  $G = 20$ . As in preceding question, provide the numerical answers and the reasoning underlying the changes.

**Answer**

a. National saving

*S remains unchanged as in Question 1*

$$S = Y(5 + 0,8(Y - T)) - G = Y5 - 0,8(Y - T) - G = 100 - 5 - 0,8(100 - 20) - 20 = 11$$





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Academic year 2005-2006

Macroeconomics

Solution 2

b. Investment

*Higher world interest lowers investment:*

$$(6) I = 20 - r = 20 - 10 = 10$$

c. External current account balance; and

*Given unchanged saving, lower investment leads to an improvement in the saving-investment gap, mirroring in the improvement in net exports.*

$$S - I = X M = NX = 11 - 10 = 1$$

d. Equilibrium exchange rate.

*The improvement in net exports is induced by a depreciation of the exchange rate.*

$$NX = 1 = 10 - 10e \Rightarrow e = -9 / -10 = 0.9$$

**Summary: Saving remains unchanged as in Question 1. Since the interest rate increases, investment is reduced. But because the unchanged saving and the reduction in investment, the gap  $S-I$  is reduced (from  $-4$  to  $1$ ), which has to be financed by capital outflows. Capital outflows ( $-1$ ) imply that net exports improve ( $+1$ , which is equal to the  $S-I$  gap), for this to happen, the exchange rate has to depreciate (from  $1.4$  to  $0.9$ ).**





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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Solution 3

**Fulbright Economics Teaching Program  
Fall Semester, 2005**

**MACROECONOMICS  
Problem Set 3- Answers**

**Due date: 8:20 a.m., October 4, 2005**

**Monetary Policy**

1. Refer to the Statistical Appendix ( SA) on Vietnam, use data in tables 17 , 18 and 19, representing the monetary survey, the central bank, and the consolidated accounts commercial banks, to answer the following questions.

- a. Find how the absolute numbers for 2002 in table 17: Vietnam. Monetary survey has been derived from tables 18 and 19. For this, give a symbol to each item in the balance sheet of the central bank (cb) and the commercial banks (cob), use those symbols to write the formula for each item in the monetary survey, replace the symbols by their values and compare the results with the actual number in table 17. Example:  $FA_{cb} + FA_{cob} = FA = 65.2 + 70.7 = 135.9$ .

**Answer**

*This question is to familiarize you with the basic and practical directions on how to consolidate the central bank and the commercial banks accounts into the monetary survey. If you could derive the numbers in table 17, you found the answers. Note that OIN may be computed by consolidating data from balance sheets of the central bank and the commercial bank, but more elegantly, it may be derived by residual from the following equations for the monetary survey:*

$$\begin{aligned} \text{Net domestic assets } NDA &= \text{MOQ } NFA; \text{ and} \\ OIN &= NDA - NDCg - DC \text{ (domestic credit to the economy)} \end{aligned}$$

- b. What is the difference between currency in circulation and currency outside banks. What is the value of currency in the vaults of all banks.

**Answer**

*A component of Reserve money in the balance sheet of the central bank is currency issue, which is defined as  
Currency issued = currency held in banks (= cash in vault) and currency held outside banks (= currency in circulation).  
More detailed information is needed to determine cash in vault.*

- b1. Write the formulae for the velocity of money and compute it for 2002.



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Academic year 2005-2006

Macroeconomics

Solution 3

### Answer

(i)  $V_{2002} = \text{GDP } 2002 / \text{MOQ} = 521/329 = 1.6$  (GDP from Basic Table of SA and MOQ from table 17);  $V_{2001} = 1.6$ .

(ii) Give the possible reasons why the velocity of money remained the same in 2001 as in 2002.

### Answer

*The unchanged velocity from 2001 to 2002 might have resulted from two opposite changes. The inflation increase from -0.4% to 4% tended to raise the velocity, which might have been offset by the decline in the velocity owing to the decline in real interest from 6.4% ( $r = 1 - \text{inflation}$ ;  $r = 6\% - (-0.4\%)$ ) to 3% ( $7\% - 4\%$ ).*

*The influence of inflation and real interest on the velocity of money might be reflected in part in the increase in the velocity of GDP relative to demand deposit (measuring the transaction demand for money) from 9.4 to 9.7 and a decline in the velocity of GDP relative to time deposits (measuring money as an asset) from 6 to 4.8.*



- c. Provide the economic reasons for the increase in broad money in 2002 (17.6%)..

**Answer**

*The increase in broad money was prompted by the rapid expansion of credit to the economy ( 15% points of 17.6%) for various sectors. Which sectors. These cannot be indicated because lack of sectoral data breakdown ( see footnote 17 of SR 2003).*

*[Note: if this is a real life situation, the analysis must also provide the purpose of those credits, such as for building roads, schools, or paying debts, etc.]*

- d. (i) Compute the rate of inflation for 1998-2002, using  $MOQ.V = P.Y$ ; (ii) compare the results with the actual rate of inflation; (iii) explain the possible causes for the difference.

**Answer**

*( i) One may use only  $PY$ =nominal GDP because  $V$  is not independently determined*

*From this, we know that:*



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Academic year 2005-2006

Macroeconomics

Solution 3

$\% P + \% \text{ real } Y = \% \text{ in nominal GDP.}$

$\% P = \% \text{ in nominal GDP.} - \% \text{ real } Y$

*Example for 2002: % in nominal GDP:  $[(521/458)-1] 100 = 13.75$ ;  
GDP deflator:  $13.75 - 5.8 (= \text{real } \%) = 7.95\% = 8\%$ .*

*(ii) . Inflation measured by the GDP deflator ( 8%) is higher than inflation measured by CPI (4%).*

*(iii) Possible causes of difference: the CPI basket has a limited coverage than the GDP deflator which covers the entire economy, CPI also has items whose prices are administered. The question: why change in GDP deflator was higher, would require more data to support the answer.*

e. What are the possible causes of the inflation rate of 4% in 2002. Provide the empirical evidence for each cause.

**Answer**

*The higher inflation rate in 2002 relative to that in 2001 seemed to be*

*attributable mainly to the high rate of bank credit expansion (22 percent), and the continued fiscal deficit ( 2% of GDP).*

- f. Suppose that the statutory (legal) reserve requirements are 7 % of total deposits of commercial banks. Did commercial banks hold any excess reserves in 2002 ( Use banks reserves in SA table 19).

**Answer**

*Deposits of commercial banks with the central bank/ total deposits:: 20.2 / 254.9= 7.9%. Excess reserves: 7.9-7= 0.9% . Banks had this much to lend .*

- g. To stabilize the price levels, the central bank sells bonds worth VND10 billion to commercial banks. Show the changes in: (i) the balance sheet of the central bank; ( ii) the consolidated balance sheet of the commercial banks; and (iii) the monetary base. Provide the economic reasoning underlying those changes.

**Answer**

*(i) The asset side of the central bank, holding of securities = minus 10 billions*



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Academic year 2005-2006

Macroeconomics

Solution 3

*The liability side of the central bank, [commercial] Bank deposits= minus 10 billions, and (iii) which is a reduction in the monetary base. The reduction in the monetary base would reduce the broad money stock.*

*(ii) The asset side of the commercial banks, bank reserves [= deposit at the central bank] = minus 10 billion;*

*The asset side of the commercial banks, holding of securities = plus 10 billions*

2. The average nominal interest rate in the US is 3 % and in Vietnam 8%. A business plan is proposed whereby one borrows US dollars from the US and put it in VND account in Vietnam. Discuss the conditions for this business to generate profits after one year of deposits.

### **Answer**

*At best, the business plan breaks even, if transaction costs are zero.*

*Profits from the differential interest rates should be at least equal to the potential loss due to the depreciation of the VND relative to the US\$ after 1 year, when the equivalent 1\$ deposited in VN is converted back to the US dollar. The depreciation of the VND reflects the assumption that the depreciation trend of the VND would continue as in recent years.*

*\$1 after 1 year deposited in the US becomes:  $1 + i_u$ ;  $i_u$  = nominal interest in the US*

*\$1 equivalent after 1 year deposited in VN becomes:  $1 + i_v$ ;  $i_v$  = nominal interest in VN*

*\$1 equivalent after 1 year deposited in VN becomes:  $1 - dep$ ;  $dep$  = depreciation rate of the VND*

*Profit after 1 year = potential loss after 1 year*

$$(1 + i_v) - (1 + i_u) = 1 - (1 - dep)$$

*Condition for break even:*

$$i_v - i_u = dep \Rightarrow \text{break even } 8.3 = 5$$

*Condition for making a profit*

$$i_v - i_u > dep \Rightarrow \text{profit.}$$

**Note:**

*According to the Fisher equation and assume that the real interests ( $r_v, r_u$ ) are equalized in the two countries, the nominal interest rates reflect the expected inflation rates ( $p_{ev}$ ,  $p_{eu}$ ), and assume that expected inflation rates are equal to actual inflation rates ( $p_v$ ,  $p_u$ )*

$$i_v = r_v + p_v$$

$$i_u = r_u + p_u ; \text{ since } r_u = r_v$$





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Academic year 2005-2006

Macroeconomics

Solution 3

*Thus:*

$$iv - iu = pv pu$$

*and if the purchasing power parity (PPP) holds, the difference in the nominal interest rates must reflect the expected changes in the nominal exchange rates between the two countries.*

*To see this, examine the real exchange rate:*

$$e = e (Pv/Pu) \Rightarrow$$

$$e = e (Pu/Pv)$$

$$\% e (= \text{depreciation of } e) = \%e + \% Pu - \% Pv$$

*Under the PPP, the VND must have the same purchasing power in every country, that is:  $e$  is fixed, thus  $\% e = 0$ .*

$$\% e = 0 + \% Pu - \% Pv = pv pu$$

*We know further that the depreciation of the VND would be equal to the*

*difference in the expected inflation rates between the two countries, assuming that the expected inflation rates are equal to the actual rates, thus:*

$$\% e = p_v p_u = p_v p_u$$

*the depreciation would be:  $\% e = p_v p_u = i_v - i_u = 8\% - 3\% = 5\%$ .*

### **Fiscal policy**

#### 3. Given the model

$$(1) Y = C + I_0 + G_0 + X_0 - M_0$$

$$(2) C = C_0 + c(Y - T)$$

$$(3) T = T_0 + tY$$

$$(4) FB = T - G_0$$

where variables with subscript zero (=0) are given and  $0 < c$  or  $t < 1$ ;

a. Show by formula and explain by words why  $t$  may be considered an automatic stabilizer.

### **Answer**



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Academic year 2005-2006

Macroeconomics

Solution 3

Put (3) into (2), one obtains:

$$C = C_0 + c(Y - T_0 - tY) = (C_0 + cY - cT_0) - ctY$$

Put this in (1) and one obtains:

$$Y = (C_0 + cY - cT_0) - ctY + (I_0 + G_0 + X_0 - M_0)$$

*The marginal propensity to tax relative to income (MPT) is an automatic stabilizer because it works to reduce income automatically (by  $ctY$ ) as income increases. Without the MPT, this automatic reduction would be zero ( $t=0 \Rightarrow ctY=0$ ). **MPT thus exercises a fiscal drag on aggregate demand and income when income increases. To reduce this drag, in 1964, tax was reduced in the US to foster economic growth.***

b. Show that an increase in the fiscal deficit may not necessarily indicate any discretionary action by the government to raise that deficit. [Hint: Compare  $FB_1$  and  $FB_2$  corresponding to  $Y_1 > Y_2$ ]

To help you to better apprehend the reasoning, you may take the following

numerical values

$I_0 = G_0 = X_0 = M_0 = T_0 = C_0 = 20$ ,  $c=0.8$ , and  $t = 0.2$

**Answer**

$Y_1 > Y_2$

$tY_1 > tY_2$  : Lower income  $Y_2$  reduces automatically tax revenue  $tY_2$  relative to  $tY_1$

$T_0 + tY_1 > T_0 + tY_2$

$T_1 > T_2$

*Given unchanged government expenditure, the fiscal deficit increases with the decline in income, without any discretionary actions from the government.*

$$FB_1 = T_1 - G_0 > FB_2 = T_2 - G_0$$

*The converse is true with an increase in income: the fiscal deficit declines without any discretionary actions from the government.*

### **Money and exchange rate**

4. Non US countries have bought large amount of US bonds. The Economist (September 5, 2005, p 70) wrote:



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Academic year 2005-2006

Macroeconomics

Solution 3

*If the central banks [of non-US countries] lost their appetite [for US bonds], the dollar could tumble while [US] interest rates rose.*

Please explain.

**Answer**

*If non-US central banks sell [lost their appetite for] US bonds, the dollar could fall [tumble]. First, non-US central banks sell bonds to obtain dollars, the interest rate rises in the monetary market. Then non-US central banks sell dollars in the foreign exchange market, in order to obtain their currencies, therefore, the prices of dollars fall.*

**IS-LM and Policies**

5. Assume an economy is described by the following equations:

- (1)  $Y = C + I + G$
- (2)  $C = 5 + 0.8(Y - T)$
- (3)  $I = 20 - r$
- (4)  $G = G_0 = 20$
- (5)  $T = T_0 = 20$

- (6)  $MOQ/P = 20$  and  $P = 1$   
(7)  $L(r, Y) = 0.2Y - 0.2r$

a. Derive the IS equation and determine slope of the IS curve.

**Answer**

*The coefficient of  $r$  relative to  $Y$  is negative, thus the IS curve is sloping downward.*

*Put (2-5) in (1) one obtains:*

*(A) IS:  $r = 29 - 0.2 Y$*

b. Derive the LM equation and determine slope of the LM curve.

Draw the IS and LM curves to experiment with the following situations. Note that the changes in the selected aggregates in each question are relative to the initial model, changes from one question do not carry to the subsequent questions, unless otherwise indicated.





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Academic year 2005-2006

Macroeconomics

Solution 3

***Answer***

*The coefficient of  $r$  relative to  $Y$  is positive , thus the LM curve is sloping upward*

*Put (6) into (7), one obtains:*

***(B) LM:  $r = y - 100$***

- c. Determine the equilibrium income (output) ( $Y$ ), equilibrium interest rate ( $r$ ),

***Answer***

*Put (B) into (A)*

*$1.2Y = 129 \Rightarrow Y = Y1 = 107.5$  ;and put this  $Y1$  into (A) on obtains  $r = r1 = 7.5 \%$*

*$I = 20 - r = 20 - 7.5 = 12.5$ ;  $C = 5 + 0.8 ( 107.5 - 20) = 75$ .*

*Draw the IS-LM curves in the  $(Y, r)$  space, the intersection of IS and LM determines the equilibrium  $Y1$  and  $r1$ .*

- d. If an economy is in recession as the Vietnam economy in 1999, the government may want to increase income by raising aggregate demand through increasing its expenditure. Suppose the government increase  $G$  by 2, ( $G = 2$ ), will the IS curve shift down to the left or up to the right and how much. How are  $Y$ ,  $r$ , changed and provide intuitive explanations for those changes.

**Answer**

*Increase in  $G$  raises planned expenditure, aggregate demand, thus production, thus income, at each interest rate. The IS curve shifts upward. Given the LM upward sloping curve, the interest rate increases. This reflects the fact that higher income raises the demand for money, since the supply of money remains unchanged, the interest rate has to rise to reduce the demand for money to make it equal to the unchanged supply of money. The new  $Y_2$  and  $r_2$  are higher than  $Y_1$ ,  $r_1$ .*

*The focus is on the correct reasoning, numerical solution is not essential..*

- e. If an economy is in recession as the Vietnam economy in 1999, the government, may alternatively, want to increase income by reducing  $T$  by 2 ( $T = -2$ ), will the IS curve shift down to the left or up to the right and how



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics

Solution 3

much. How are  $Y$ ,  $r$ , changed and provide intuitive explanations for those changes.

**Answer**

*The reduction in  $T$  raises disposable income, thus planned consumption, thus planned expenditure thus planned aggregate demand, thus production, thus income, at each interest rate, the IS curve shifts upward. Given the LM upward sloping curve, the interest rate increases. This reflects the fact that higher income raises the demand for money, since the supply of money remains unchanged, the interest rate has to rise to reduce the demand for money to make it equal to the unchanged supply of money. The new  $Y_3$  and  $r_3$  are higher than  $Y_1$ ,  $r_1$ .*

*The focus is on the correct reasoning, numerical solution is not essential..*

*[Note: However  $Y_3$  and  $r_3$  are lower than  $Y_2$ ,  $r_2$  because, the increase in the disposable income as a result of the decrease in tax, will translate into an increase in consumption less than the increase in the disposable income due to the MPC, thus the increase in the aggregate demand, production, and income is less than in the case of the increase in  $G$  by the same amount as the decrease in  $T$ .]*

- f. Inflation tends to rise, as in Vietnam in 2005, one policy alternative to cut the

inflation rate is to reduce the money supply. (i) Indicate the instruments the government may use to reduce the money supply; (ii) If  $MOQs$  is reduced by 2, ( $\Delta MOQs = -2$ ), will the LM curve shift down to the right or up to the left and how much. How are  $Y$ ,  $r$ , changed, and provide intuitive explanations for those changes.

### Answer

- (i)  *$MOQs$  might be reduced by increase the discount rate, the reserve requirements ratio, or selling bonds.*
- (ii) *The decrease in  $MOQs$  must be matched by a decrease in money demand. This may be achieved by raising the interest rates at each level of  $Y$ , therefore, the LM curve shifts up to the left. Given the IS downward sloping curve, the interest rate increases and income declines. This reflects the fact that the higher interest rate reduces planned investment, thus expenditure, thus aggregate demand, thus production, and thus income. The new  $Y_4$  is lower than  $Y_1$  and  $r_4$  are higher than  $r_1$ . The focus is on the correct reasoning, numerical solution is not essential.*

### Overall Analysis



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Academic year 2005-2006

Macroeconomics

Solution 3

6. In the second half of September 2005, banks in Vietnam increase the nominal interest rates on their lending. Trace qualitatively the first round and the second round impacts of this action on the economy of Vietnam.

This means one has to indicate clearly the impacts on selected economic objectives--namely GDP, inflation, and net foreign assets and other relevant aggregates. Indicate the direction of change of each aggregate and provide a short explanation why that change takes place.

*Hint: Trace those impacts through the equations representing the real, fiscal, and monetary and the external sectors, the quantity equation, the Fisher equation, and the relations between the real, nominal, exchange rate and domestic and foreign prices.*

### **Answer**

*This question aims at showing how a change in a variable may affect the whole economy. The tracing of the impacts through the 4 sectors and the use of the quantity equation, the Fisher equation, and the relations between the real and nominal exchange rate and domestic and foreign prices, is a device to ensure that the examination of the impacts on major aggregates is complete. The following tracing of the impacts from one sector to another is one possibility. Other paths for tracing impacts among sectors are possible. As long as the reasoning is correct, you have a correct answer. You should*



read 1st round(1) for all sectors, then read all 2<sup>nd</sup> round (2, to follow the reasoning.)

### **A. Monetary sector)**

*Before examining the first round impact, we have to briefly review the reasons for the increase in the nominal interest rate and to make some assumptions to better anchor our reasoning.*

*The increase in the nominal interest rate ( $i$ ) is assumed to aim at reducing demand for bank credit in order to reduce inflation pressure. Thus, the increase in the nominal interest ( $i$ ) leads to an increase in the real interest rate ( $r$ )*

$$r = i - p_e > 0;$$

*assuming that expected inflation  $p_e$  is equal to actual inflation  $p$  at the time  $t1$  when  $i$  was increased, we have*

$$r = i - p_e > 0;$$

:

*Banks increase  $i$  is assumed to be the result of moral suasion from the central bank and not from any uses of the monetary instruments to reduce money supply.*

**1. First round. Higher  $r$  reduces the demand for money  $MOQ_d$ , leading to  $MOQ_s > MOQ_d$  since  $MOQ_s$  remains unchanged**



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Academic year 2005-2006

Macroeconomics

Solution 3

**2. Second round. Lower NFA from BOP reduces  $MOQs$  to move toward closing the gap between  $MOQs$  and  $MOQd$ , assuming that in this 2<sup>nd</sup> round, this gap is closed and  $MOQs = MOQd$ . If the gap is not closed, a 3<sup>rd</sup> round is considered, and so on, until equilibrium is reached. Lower  $MOQs$  reduces  $P$  in the 2<sup>nd</sup> round below.**

**3. 3<sup>rd</sup> round. Higher NFA from the 2<sup>nd</sup> round in the BOP sector, raises  $MOQs$ , leading to  $MOQs > MOQd$ , leading to lower  $r$ , and the process continues until reaching equilibrium in this market.**

### **B . Real sector**

1. Higher  $r$  reduces investment, reduces production  $Ys$ , reduces net exports  $NX$  that affect BOP in the first round, and reduces income  $Y$ ; and lower  $Ys =$  lower  $Y$ . [Note ; This reduction in  $Y$  and increase in  $r$  may also result from the use of IS-LM where LM curve is shifted upward.]
2. Higher  $NX$  from the 2<sup>nd</sup> round in the BOP sector, raises aggregate demand,  $Yd$ , thus raises productions  $Ys$  until  $Yd = Ys$
3. High borrowing from the public by the government in the 2<sup>nd</sup> round in the fiscal sector, to finance the fiscal deficit raises the interest rate-- due to crowding out of the private sector ( government borrowing competes with the private sector for

*borrowing the unchanged private sector saving) which reduces planned investment, and the process continues..*

### **C. Fiscal sector**

1. *Assume tax revenue  $T = tY$ ; lower  $Y$  reduces  $T$ , increase the deficit  $DEF$ , given unchanged government expenditure, thus  $DEF >$  financing.*
2. *From the 2<sup>nd</sup> round in the monetary sector,  $MOQ_s = MOQ_d$ , for simplicity, assuming that, the government does not want to change this equilibrium, it raises domestic borrowing from the public  $BRW_g$  to finance the deficit =  $.NDC_g + BRW_g + GRT_g + D_g$ . Any other financing,  $.NDC_g$ ,  $GRT_g$ , and  $D_g$ , would raise  $MOQ_s$ , which would break the equilibrium between money demand and money supply and would require the start of another round.*

*Higher borrowing may feed back into the real sector, which would start another round by raising  $r$  to reduce planned investment, and the process continues, until equilibrium is reached in all the markets.*

### **D. BOP**



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Academic year 2005-2006

Macroeconomics

Solution 3

1. Lower  $NX$  from the Real sector in the 1<sup>st</sup> round, increases inflows of capital, thus **reducing net foreign assets of the banking system.** [Note: a reduction in NFA means a liquidation of placements in foreign countries to bring capital home; an increase in NFA means the reverse]; BOP is in equilibrium  $.NFA = CA + CF$  (other than  $.NFA$ ). This lower NFA will feedback to 2<sup>nd</sup> round in monetary sector to balance money demand and supply.

2. Lower  $e$  from Exchange rate section below, increases  $NX$ , thus raising capital outflows, thus raising NFA to feed back into the Money sector to initiate a 3<sup>rd</sup> round; BOP is in equilibrium  $.NFA = CA + CF$  (other than  $.NFA$ ).

### **E. Prices**

1. Price level has not moved at the 1<sup>st</sup> round, it would decline in the 2<sup>nd</sup> round when reduction in  $.NFA$  reduces  $MOQs$ .
2. Lower  $MOQs$  from the 2<sup>nd</sup> round in monetary sector reduces  $P$ , which in turn reduces  $e$  in the second round below.

### **F. Exchange rate**

1.  $e = e P/P^*$ ; since  $P$  has not declined in this round yet, the real exchange rate  $e$  remains unchanged in this round;  $P^*$  is assumed unchanged..
2. Lower  $P$  from the 2<sup>nd</sup> round in Prices above, reduces  $e$ , which in turn, increases  $NX$  in the real sector and the BOP sector, triggering a new round, etc.





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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

**Fulbright Economics Teaching Program  
Fall Semester, 2005  
MACROECONOMICS**

**PROBLEM SET 4: ANSWERS**

*Distribution Date: Tuesday, October 4, 2005*

*Due Date: Tuesday, October 11, 2005*

Whenever relevant, write down the basic equations on which you base your reasoning for answering the questions.

**Exchange rate**

**Question 1**

When the real exchange rate decreases, net exports (or the external current account) increase. Is this correct. Explain your answer.

**Answer**

*Yes, it is correct, in the sense that the real exchange rate and net exports move in the opposite directions.*

*Given the nominal exchange rate, the real exchange rate declines when domestic*

*prices decline relative to foreign prices. The lower domestic prices tend to raise exports, while the higher relative foreign prices tend to lower imports. Overall,  $NX = X - M$  tend to improve (the word improve covers two cases.  $NX$  increase if its initial level is a surplus and it decrease if its initial level is a deficit).*

### **Question 2**

The equilibrium real exchange rate of the VND is obtained when the supply of VND available from the net inflows of capital is equal to the demand for VND by foreign buyers of Vietnam net exports. Is this correct. Explain your answer

### **Answer**

*No, it is not correct. Net inflows of capital (CF) into Vietnam are equivalent to selling foreign exchange to demand (buy) VND. The net inflows have the mirror image as net exports (or current account) deficit, so as to have  $NX + CF = 0$ , by the definition of the BOP.*

*The deficit in CA means that  $X - M < 0$ ,  $\Rightarrow M > X$ , implying that VN importers demand foreign currencies and supply (sell) VND.*

### **Question 3**

In 2004, the fiscal deficit of Vietnam as a percentage of GDP increased relative to 2003. What could have been the effect of this apparent expansionary fiscal policy on the real exchange rate. Explain your answer.



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

### Answer

*The increase in the fiscal deficit tends to raise the aggregate demand, thus raising price levels, thus raising the real exchange rate, in accordance with the definition of*

$$e = e P/P^*$$

### Question 4

Given the value of the real exchange rate  $e$ ,

a. If the domestic price level in VN rises, the nominal exchange rate of VND,  $e$  falls. Is this correct. Explain your answer

### Answer

*Yes, it is correct, according to the definition of  $e$  obtained from the definition of the real exchange rate.*

$$e P^*/P = e$$

b. If the foreign price  $P^*$  (non- US prices) rises, the nominal exchange rate of VND, rises. Is this correct. Explain your answer.

### Answer

*Yes, it is correct, according to the definition of  $e$  obtained from the definition of the real exchange rate.*

*[ Note: If  $P^*$  is prices in the US, and by virtue of de facto peg of the VND to the US\$, the nominal exchange rate may remains unchanged because money supply in VN would be raised to inflate  $P$  by the same percentage of increase in  $P^*$  to maintain the peg.]*

- c. In 2004, it was estimated that broad money stock broadly increased by 26% and real GDP increased by 7 %. What is the likely effect of an increase of money supply on the nominal exchange rate. Explain the mechanism of transmission from increase of money supply to the change in the nominal exchange rate. Mechanism of transmission, in this context, means the chain of causes-effects from the initial action to the final outcome.

**Answer**

*The nominal exchange rate will rise, because domestic prices rise.*

*Why.*

*% MOQ + %  $V$  = %  $P$  + % real GDP; assuming unchanged  $V \Rightarrow$  %  $V=0$ , one has:*

$$\% \text{ MOQ} - \% \text{ real GDP} = \% P$$

$$26\% - 7\% = 19\% = \% P$$



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

### Question 5

An expansion in fiscal policy tends to cause an increase in the external current account deficit, an equivalent net inflow of capital and an appreciation of the exchange rate. Is this correct. Explain your answer.

#### Answer

*Yes, it is correct.*

*An expansion in fiscal policy tends to reduce saving, the (S I) gap tends to move into the negative, (X-M) tends to move also into the negative, meaning that the external current account deficit tends to increase. This increase reflects the real exchange rate appreciation ( which raises imports and reduces exports because domestic prices tend to rise relative to foreign prices. The domestic prices tend to rise because of the increase in the aggregate demand caused by the expansionary fiscal policy).*

### Mundell-Fleming Model

#### Question 6

If a small country has perfect capital mobility, domestic interest  $r$  is equal world interest rate  $r^*$ , which is  $r^*=r$ . With this definition of a small economy, is Vietnam a small economy. Why.

#### Answer

*Vietnam does not have perfect capital mobility*

*Therefore, VN is different from the economy according to this definition.*

### Question 7

In a small economy, and under floating exchange rate,

a. A monetary expansion increases incomes and lowers the exchange rate. Is this correct. Explain your answer.

#### Answer

*Yes, it is correct. A monetary expansion shifts the LM curve to the right, given the negative slope of the IS\* curve, it lowers the exchange rate.*

b. A fiscal expansion does not have any effect on income but raises the value of the exchange rate. Is this correct. Explain your answer.

#### Answer

*Yes, it is correct. Given the vertical LM\*, a fiscal expansion shifts the IS\* curve to the right, it raises the exchange rate does not change income.*

c. Does the Vietnam economy fit this model. Explain your answer.





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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

### Answer

*Vietnam does not fit into this model because, it does not follow a floating exchange rate regime.*

### Question 8

In a small economy, and under fixed exchange rate,

a. A monetary expansion does not have any effect on income, exchange rate. Is this correct. Explain your answer.

### Answer

*Yes, it is correct. A monetary expansion does not have any effect on income, exchange rate.*

*A monetary expansion shifts the LM\* curve to the right, this would lower the exchange rate, but because the exchange rate is fixed, the money supply has to be reduced to the original level to return to the original exchange rate and income. Thus the fixed exchange rate, monetary instrument may not be used.*

b. A fiscal expansion raises income and does not have any effect on the exchange rate. Is this correct. Explain your answer.

### Answer

-----

*Yes, it is correct. A fiscal expansion raises income and does not have any effect on the exchange rate.*

*Given the vertical  $LM^*$  curve, a fiscal expansion in the 1<sup>st</sup> phase, shifts  $IS^*$  curve to the right to  $IS1^*$ , raising the exchange rate above the fixed rate. In the 2<sup>nd</sup> phase, to bring the higher rate to the original fixed rate, expansion monetary policy would have to shift the  $LM^*$  to the right to  $LM1^*$  to pass through the intersection of the fixed exchange rate line and the  $IS1^*$ .*

c. Does the Vietnam economy fit this model. Explain your answer.

**Answer**

*Vietnam does not fit into this model because, it does not follow a floating exchange rate regime.*

**Question 9**

A country does not have any restriction on its capital movements, its domestic interest rate should be equal to the world interest rate. But in actuality, they are different. Why.

**Answer**

*The equality between the domestic interest rate and the world interest rate holds ( $r = r^*$ ), if there is free mobility of capital, and if the transactions-- due to the*



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

*conversion from VND to foreign currency and from this back to VND-- are costless and there are no expected changes in the exchange rate. Because the presence of the latter 2 factors, interest rates are different among different countries, despite the free capital movements.*

**Note:**

*To see this, let us examine the decision to invest in the domestic financial assets and in foreign assets.*

*VND 1 invested in financial assets in VN, say in time deposit, at the nominal interest rate ( $i$ ), at the end of the year, yields:*

$$(1) \text{ invest in VND} = (1 + i)$$

*Instead of investing in VN, take VND 1 and invest it abroad. First, VND 1 must be exchanged to foreign currency at the exchange rate ( $e$ ): ( $1 \times e$ ), then deposit this in the foreign country at that country interest rate ( $i^*$ ). At the end of the year, one obtains*

*( $1 + i^*$ )  $e(t)$  is the exchange rate at time ( $t$ ), the next day, this amount is converted back to VND at the exchange rate  $e(t+1)$ :*

$$(2) (1 + i^*) e(t) / e(t+1).$$

*Equilibrium condition:*

*The total amount invested in VN must equal the amount invested in foreign country converted to VND:*

$$(1) = (2)$$

$$(3) (1 + i) = (1 + i^*) e(t) / e(t+1).$$

*Equation (3) represents the uncovered interest parity.*

*Since the exchange rate in period (t+1) is equal to the exchange rate in period (t) plus the percentage change in the exchange rate applied to e (t), one may write:*

$$(4) e(t+1) = e(t) (1 + .e/e)$$

*Put (4) into (3) and since (.e/e x i) is small, it may be assumed to be equal to 0, one obtains:*

$$(5) i - i^* = - .e/e$$

*Thus,  $i = i^*$  if  $-.e/e = 0$*

*Since  $-.e/e$  is usually  $\neq 0 \Rightarrow i - i^* \neq 0$ , meaning that domestic interest rate and world interest rates may differ.*



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Academic year 2005-2006

Macroeconomics  
Problem set

Problem set 4

## Aggregate supply

### Question 10

In the Vietnam economy, wages are sticky.

- a. If nominal wage is fully indexed to the CPI, meaning that nominal wage is fully adjusted to compensate for the change in the CPI. How does a full indexation alter the aggregate supply curve.

### Answer

*The nominal wage is equal the desired real wage multiplied by expected price  $P_e$*

*(1)  $W = . P_e$ .*

*Full indexation is equivalent to the full adjustment of  $W$  to actual price:*

*(2)  $W = . P$ .*

*From (1) and (2), one has:*

*(3)  $P = P_e$ ; and*

*real wage  $. = W/P$ , since real wage does not change, because nominal change by the same percentage as the change in the price level, thus demand for labor does not change and*

*$Y = Y$ , the aggregate supply curve is vertical.*

- b. How does a partial



indexation alter the aggregate  
supply curve.

**Answer**

*The unexpected price will increase nominal wage but not as much as the increase in  $P$  therefore real wage  $W/P$  declines. This causes firms to hire more labor and production rises. The aggregate supply curve slopes upward.*



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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

**Fulbright Economics Teaching Program**  
**Fall Semester, 2005**  
**MACROECONOMICS**

**ANSWERS for PROBLEM SET 5**  
**Due Date: October 18, 2005**

**Question 1: Explaining concepts and facts**

- 1) The Solow growth model predicts that per capita incomes among countries in the world will tend to converge. Explain briefly why in reality per capita income gap between rich countries and poor countries is not closing.

**Answer: The Solow growth model predicts that per capita incomes among countries in the world will tend to converge if they use the same production function (same level of technology). In reality, rich countries have higher productivity than poor countries. This can be explained by higher knowledge level and better skills of labors in rich countries. It is therefore, easier for them to adopt advanced technology and also forms the foundation for new technology creation. Other conditions might add to that such as some rich countries are more open to international trade, located closed to R&D centers, with strong infrastructure and legal environment (intellectual property rights) that are supportive to technology**

*transfer and development.*

2) What is Solow residual. How is this residual in relation to knowledge and innovation.

**Answer: It is the change in output that cannot be explained by changes in inputs (K, L). The residual reflects the growth in total factor productivity which is assumed as exogenous variable in the Solow model and theoretically denoted as  $A$ . Rate of change in  $A$  depends on level of innovation and knowledge that an economy possesses.**

3) Today, economists recognize that knowledge plays important role in economic growth, the dissemination of knowledge will help create spillover effects and growth in total factors of production (TFP). Yet, the transfer of knowledge has raised social benefits considerably compared to own market value. This beneficial difference can discourage future knowledge creation. What are solutions to this externality in order to give incentive to new knowledge development. Explain your reasoning.

**Answer: The fundamental issue is difference between individual and social interests. To solve this problem, the externality should be internalized to bring up right incentive. Often solutions are intellectual property rights such as copyrights and patents, and proper enforcement of these rights. These will limit possibility of copying and counterfeiting on the one hand and promote individual creativity on the other. Yet, these solutions also limit the scope of technological transfer, thus in reality the protection is subject to time limits.**



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

*Establishment of venture fund to finance micro-enterprise innovation and financing R&D are among other possible solutions to promote individual creativity.*

### Question 2: Growth model

- 1) You are asked to study the development of country IRA. You decide to use a simple Cobb Douglas production function. The exponents of this function are determined by regression method. The function is:

$$Y = K^{1/2} L^{1/2}$$

#### Answer:

- a) Derive per-worker production function  $y = f(k)$ .

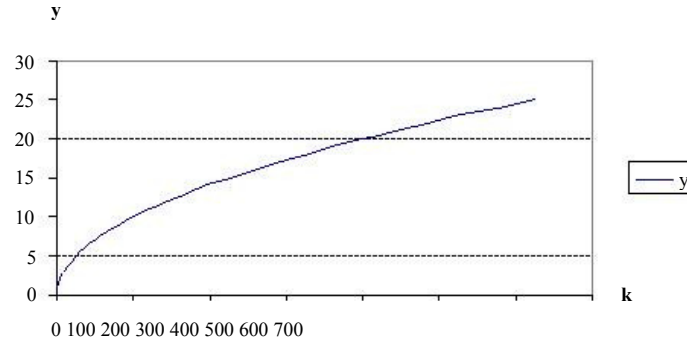
$$\frac{Y}{L} = \left(\frac{K}{L}\right)^{1/2}$$

$$y = k^{1/2}$$

- b) Calculate output per worker against each level of  $k = 1, 4, 9, 16, 25$

|     |   |   |   |    |    |
|-----|---|---|---|----|----|
| $k$ | 1 | 4 | 9 | 16 | 25 |
| $y$ | 1 | 2 | 3 | 4  | 5  |

c) Draw a graph for per-worker production function



- 2) Your next task is to study IRA economy in 2004 and you come up with the following information: (1) an average IRA citizen saves 30% her income, (2) each year capital stock depreciates 10% during production, (3) there are 4 million workers in IRA and there seems no increase in the amount of labors, your computing unit is million workers ( $L = 4$ ), (4) capital stock is 16 million dollars with computing unit in million ( $K = 16$ ). Technology level in IRA has not changed. Based on the information, calculate:





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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

**Answer:**

a) *Amount of capital per worker (k)*

$$k = \frac{K}{L} = \frac{16}{4} = 4$$

b) *Output per worker (y)*

$$y = k^{1/2} = (4)^{1/2} = 2$$

c) *Savings per worker (sy)*

$$\frac{S}{Y} = sy = 0,3 * 2 = 0,6$$

d) *Consumption per worker: (1-s)y*

$$c = (1-s)y = 0,6 * 2 = 1,2$$

e) *Gross and net capital investment per worker (i)*

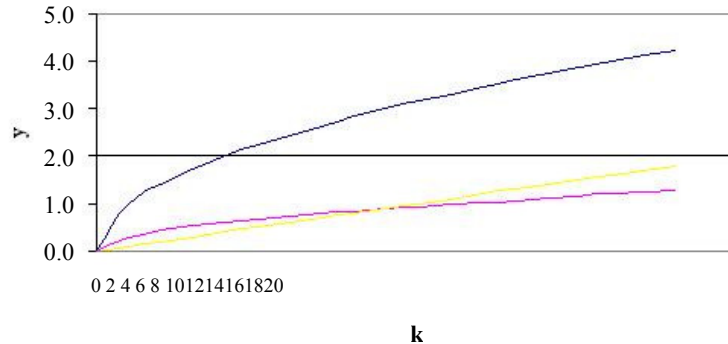
$$i_g = sy = 0,6 \quad i_n = 0,6 - 0,4 = 0,2$$

f) *Depreciation per worker*

$$.k = 0,1 * 4 = 0,4$$

g) *Draw a graph of per-worker production function to illustrate IRA economy in 2004.*

Hitteconoly 2004



- 3) In your calculation, you explain to the government that when capital stock per worker grows, the increase in output per capita is lower. It is because of diminishing marginal product of capital. When output per worker decreases, so does saving per worker. At some points, the additional increase in output per worker will generate just enough investment per worker to offset depreciation. At this point, the economy reaches the steady state. You have to prepare data at this steady state and present to the IRA government, including:



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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

**Answer:**

a) *Capital stock and amount of capital per worker*

*When the economy reaches steady state, gross investment is equal depreciation investment or net investment is zero*

*Amount of capital per worker*

$$s y^* = d k^*$$

$$0,3(k^*)^{1/2} = 0,1(k^*)$$

$$k^* = 9$$

*Capital stock*

$$K^* = k^* \cdot L = 9 \cdot 4 = 36$$

b) *Real GDP and*

$$Y = (36)^{1/2} \cdot (4)^{1/2} = 12$$

*Output per worker*

$$y^* = (k^*)^{1/2} = 9^{1/2} = 3$$

c) *Total consumption and consumption per worker*

$$i^* = s y^* = 0,3 \cdot 3 = 0,9$$

$$I^* = i^* \cdot L = 0,9 \cdot 4 = 3,6$$

d) *Gross investment per worker*

$$c^*$$

Total investment

$$I^* = c * L = 2,1 * 4 = 8,4$$

- e) <sup>s)</sup> ~~Percentage~~ of income allocated to worker and capital  
 With first degree production function and coefficient  $a = 0,5$ , the share is 50% and 50%  $0,7 * 3$
- f) ~~Capital growth rate~~  
 At the steady state and with unchanged amount of labors, capital stock, capital per worker, output or GDP and output per worker are all unchanged. Or growth rates of these variables are zero.
- 4) Now the chairman of IRA Economic Advisory Committee is not satisfied with real GDP growth rate at the steady state. In his opinion, at this steady state, the rate should be higher if saving rate is growing from 30 to 40%. Assess this proposal. In doing so, you need to calculate again the variables in question 3 at 40% saving rate.

**Answer:**

- a) *Capital stock and amount of capital per worker*  
 When the economy reaches steady state, gross investment is equal depreciation investment or net investment is zero  
 Amount of capital per worker



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Fulbright Economics Teaching Program  
Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

$$s y^* = d k^* \\ 0,3(k^*)^{1/2} = 0,1(k^*) \\ k^* = 9$$

*Capital stock*  
 $K^* = k^* \cdot L = 9 \cdot 4 = 36$

b) *Real GDP*  
 $Y = (36)^{1/2} = 6$   
*Output per worker*  
 $y^* = (k^*)^{1/2} = 9^{1/2} = 3$

c) *Gross investment per worker and total investment*  
 $i^* = s y^* = 0,3 \cdot 3 = 0,9$   
 $I^* = i^* \cdot L = 0,9 \cdot 4 = 3,6$

d) *Consumption per worker*  
 $c^* = (1-s)y^* = 0,7 \cdot 3 = 2,1$   
*Total consumption*  
 $C^* = c^* \cdot L = 2,1 \cdot 4 = 8,4$

e) *Percentage of income allocated to worker and capital*  
*With first degree*  $a =$

production function and coefficient 0,5,  
 the share  
 f) Capital growth rate is  
 At the steady state and with unchanged amount of labors, capital stock, capital per worker, output or GDP and output per worker are all unchanged. Or growth rates of these variables are zero. 50% and

- 5) The president of IRA sets forth long term objective that is raising living standards via maximizing consumer future consumption. He believes that he can persuade the public to change their saving habits, giving up part of their current consumption to future generation. What left is should savings be raised or lowered and how much. You have to help him determine the economy optimal saving level.

**Answer:**

Condition for optimal savings in the economy is when marginal product of capital is equal depreciation rate,  $MPK = d$

$$MPK = \frac{\partial y}{\partial k} = \frac{1}{2} k^{-1/2} \quad (1)$$

$$d = 0,1 \quad (2)$$





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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

from (1) and (2) one determines  $k_G = 25$  and from the production function one also determines  $y_G = 5$

At the equilibrium point, one has

$$s_G y_G = d k_G$$

$$s_G = \frac{d k_G}{y_G} = \frac{0,1 \cdot 25}{5} = 0,5$$

- 6) To increase growth, the chairman of IRA Economic Advisory Committee allows net labor immigrants of 10% labor force. Based on this new assumption, re-calculate variables in questions 3 and show whether this proposal is beneficial to the economy. Should IRA government accept this proposal. For an informed decision, consider the following issues:

**Answer:**

a) *Capital stock and amount of capital per worker*

*When the economy reaches steady state, gross investment is equal depreciation investment to keep  $k$  unchanged*

*Capital per worker*

$$s y^* = (d + g_L) k^*$$

$$0,3(k^*)^{1/2} = (0,1 + 0,1) (k^*)$$

$$k^* =$$

*Capital stock*

$$K^* = k^* \cdot L = 2,25 \cdot 4 = 9$$

b) *Real GDP*

$$Y = (9)^{1/2} (4)^{1/2} = 6$$

c) *Output per worker*

$$y^* = (k^*)^{1/2} = (2,25)^{1/2} = 1,5$$

d) *Gross investment per worker and total investment*

$$i^* = s y^* = 0,3 \cdot 1,5 = 0,45$$

$$I^* = i^* \cdot L = 0,45 \cdot 4 = 1,8$$

e) *Consumption per worker*

$$c^* = (1-s)y^* = 0,7 \cdot 1,5 = 1,15$$

*Total consumption*

$$C^* = c^* \cdot L = 1,15 \cdot 4 = 4,6$$

f) *Percentage of income allocated to capital and worker (unchanged)*



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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

- g) *At the steady state and with unchanged amount of labors, capital stock, capital per worker, output or GDP and output per worker are all unchanged. Or growth rates of these variables are zero. However, with population growth is 10%, the growth rates of capital and output or GDP at the steady state are also 10%*

*The IRA government should not accept this proposal even when increase in labors leads to increase in real GDP. Because when population grows, living standards will decline due to decrease in per capita income during adjustment to a new steady state, unless these are skilled labors who can increase productivity in the economy.*

### **Question 3: Economic growth policy**

- 1) In the 1990s, Vietnam was among countries with highest growth rates in the world. Why would Vietnam have such high growth rate. What is your assessment on policy and institution reform in this period.

**Answer: Starting from a country with low income, macroeconomic policy reform had significant impacts on economic growth of Vietnam in the 1990s. Such initial reform was not technically difficult (not required high-tech) for poor country like Vietnam, yet it required political will. Some most important policy reforms during this period were:**

- a) *Disinflation policy: Vietnam solved this problem and pulled inflation down to an*

*acceptable low level by employing a difficult measure which was reduction of almost credits to SOEs.*

- b) Price liberalization: abolished price control to most consumption goods, services and agricultural products; deregulated state control over enterprises, giving them more autonomy to join market; devaluated the exchange rate to close gap between official and market exchange rates.*
- c) Financial reform: reorganized banking system, strengthened control on banks lending to direct capital to productive uses.*
- d) Investment and trade liberalization: gradually cut down tariff and non-tariff barriers; limited state monopoly and opened the economy to attract FDI.*
- e) Enhanced property rights is the first step in institutional reform. The first land reform was actually giving households legal right to use the land they were cultivating, and there already existed a market for land. Enterprise Law and Investment Law have also improved greatly property rights to facility and equipments.*

*In general, economic growth in Vietnam during the 1990s stemmed from macroeconomic policy reform, when the countrys per capita income was very low.*

- 2) Based on the convergence hypothesis, what is your prediction on per capita income growth rate before reaching equilibrium and the steady state without any change in institution and policy.



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Macroeconomics  
Problem set

Answers for Problem set 5

**Answer: Both theory and real life show evidence of conditional convergence of income:**  
*given other policies unchanged, growth rate of per capita income in low-income countries tends to reduce as their income levels increase further. That will be the case for Vietnam if there is no continued reform in institution and policy.*

- 3) New growth models focus on the importance of creating a supportive environment for firm and individual innovation, whether it is done by increasing spending on R&D to produce new products, by transferring or copying advanced technologies from other countries, or by upgrading knowledge and skills. Based on these growth models and with real life evidence, determine what kind of key reform that Vietnam needs to have in order to maintain a sustainable growth rate in the future.

**Answer: To create a good environment for firm and individual innovation, institutional and policy reform should be continuous.**

- a) *Deeper legal reform (covering issues such as, personal property protection, contract law, business formation law) is needed to protect interests of firms and individuals in the context of weak legal business environment.*
- b) *Enhance state regulation to improve market efficiency (selective regulations and controls on certain type of markets, instruments, prices, and competition promotion), and to create a competitive environment for investors.*
- c) *Financial reform. (develop financial market and increase competitiveness of financial*



*intermediates) Give priority to creating a pro-growth environment. (allocate resources to highly productive projects) and build up a sound financial infrastructure that can accommodate possible financial crisis when the economy becomes more developed and integrated.*

- d) Continue opening to investment and trade, expanding markets, attracting capital, using technology from advanced countries, and facilitating domestic reform.*
- e) Boost administration reform in order to be competent in policy making and powerful in policy implementation. A policy framework for efficient investment and development in infrastructure and education is needed.*

#### **Question 4: Exchange rate policy**

**Reviewing the economic developments in Vietnam for period 2000-03, an** international financial organization made some recommendations regarding the exchange rate policy ( see paragraph 69, Bao cao tham van theo Dieu IV nam 2003, *cua IMF doi voi Vietnam, [SR2003]. These recommendations were:*

1. The managed float is appropriate for Vietnam;

#### **Answer**

- a. The central bank had two objectives: price stability and economic growth (para. 30, 36).*



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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

b. *The central bank seemed to use monetary to reach those goals. A fixed exchange rate regime would not be appropriate because under this regime, monetary policy would have no effect on real variable (e.g. income). A floating exchange rate would not be appropriate either, because under this regime, fiscal policy tends to become ineffective. Because of the twin objectives of price stability and economic growth, a managed float would be appropriate. Two instruments would be needed, monetary policy and fiscal policy, to target two objectives.*

2. It should be implemented with more flexibility;

**Answer**

- a. *The exchange rate band was narrow 0.25% (para.17) and the central bank seemed to adhere to a pre-determined crawl (para. 39). These two elements seemed to limit the use of monetary policy.*
- b. *More flexibility in the exchange rate would be appropriate to increase the effectiveness of monetary policy and which could be use to cope with shocks that are likely to be more numerous in an economy undergoing structural change (para. 39).*

3. The central bank has appropriately increase its foreign reserves; and

**Answer**

- a. *Foreign reserves amounted only to 8.5 weeks of next years imports (SR2003, table 2).*
- b. *Higher level of foreign reserves would be needed to provide a minimum coverage for rapidly growing annual import bill. (para.40)*
4. The central bank should be more active in sterilizing the impact of its purchases of foreign exchange on bank liquidity.

**Answer**

- a. *The purchase of foreign currency in 2003 being largely unsterilized ( para. 16), and broad money grew rapidly ( some 18% in 2002 and in early 2003).*
- b. *Because inflation picked up in 2002 ( para. 13) due in part to rapid expansion of broad money, and unsterilized foreign reserves, one way to limit broad money growth would be to sterilize those foreign reserves.*

Explain why those recommendations were made. For this task and for each recommendation,



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Academic year 2005-2006

Macroeconomics  
Problem set

Answers for Problem set 5

- a. Identify and analyze the issues (see, for example, SR 2003, para. 15-17; 30-40 and especially para. 39-40); and
- b. The reasons for making the recommendations.

For each question (a) and (b), answer concisely, and only 3 lines are allowed.

#### **Question 5: Aggregate supply and unemployment**

1. Unanticipated increase in the money supply affects real GDP. Is this true and why.

**Answer: Yes, unanticipated increase in the money supply, unexpectedly raises P which makes P different from  $P_e$ , thus raises real GDP. This reflects the equation:**

$$Y = Y_o + a (P - P_e)$$

2. A participant in FETP 11 states that: I can predict accurately the future prices and wages, if all persons in Vietnam are like me, monetary policy is irrelevant Is this true and why.

**Answer: Yes, any changes in money supply lead to changes in  $P_e$  which is always equal to P and  $Y = Y_o$ , regardless of the stance of monetary policy. This reflects the Policy**

***Irrelevance Principle.***

3. Indicate the best policy for Vietnam to minimize the potential increase in unemployment due to an increasing globalization of the economy, which will induce unexpected changes in the composition of demand among industries. Why.

**Answer: Unexpected changes in the composition of demand among industries would lead to changes in demand for skills, and raise frictional unemployment due to outdated or inadaptable skills. Education and training to update skills and to make them more adaptable to changing job requirements would reduce potential unemployment due to sectoral shift in demand following increased globalization.**





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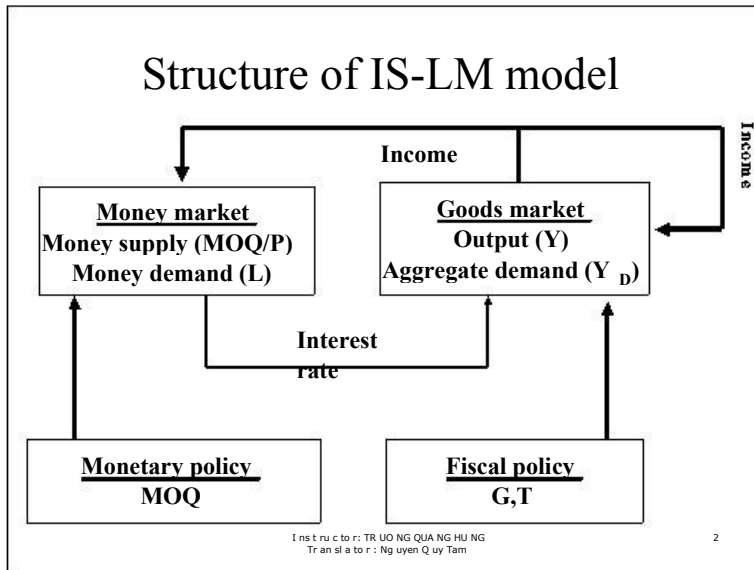
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# IS-LM MODEL

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Translator: Nguyen Quy Tam

1



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# A. GOODS MARKET AND THE IS CURVE

## I. Goods market

### I.1 Equilibrium output

I.1.1 Aggregate demand  $Y_D = C + I + G$

I.1.2 Equilibrium output  $Y = Y_D$

I.1.3 Equilibrium output and income identity

I.1.4 Unplanned inventories  $UI = Y - Y_D$

### I.2 Implication of equilibrium output

I.2.1 Aggregate demand determines equilibrium output

I.2.2 Output adjusts toward equilibrium

I.2.3 Equilibrium output is not necessarily potential output

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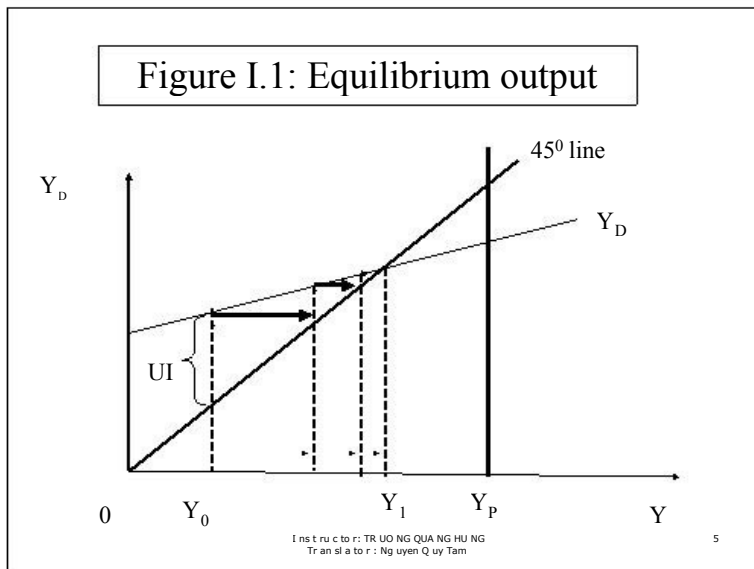
4



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## II. Consumption and saving function

### II. 1 The private consumption function

$$\text{II.1.1} \quad C = C_0 + \text{mpc}(Y-T)$$

$$\text{II.1.2} \quad \text{mpc} = dC/d(Y-T); 0 < \text{mpc} < 1$$

$$\text{II.1.3} \quad T = T_0 + tY$$

$$\text{II.1.4} \quad C = C_0 + \text{mpc}T_0 + \text{mpc}(1-t)Y$$

### II. 2 The national saving function

$$\text{II.2.1} \quad S = Y - C - G$$

$$\text{II.2.2} \quad S = Y - (C_0 + \text{mpc}T_0 + \text{mpc}(1-t)Y) - G_0$$

$$\text{II.2.3} \quad S = -C_0 + \text{mpc}T_0 - G_0 + (1 - \text{mpc}(1-t))Y$$

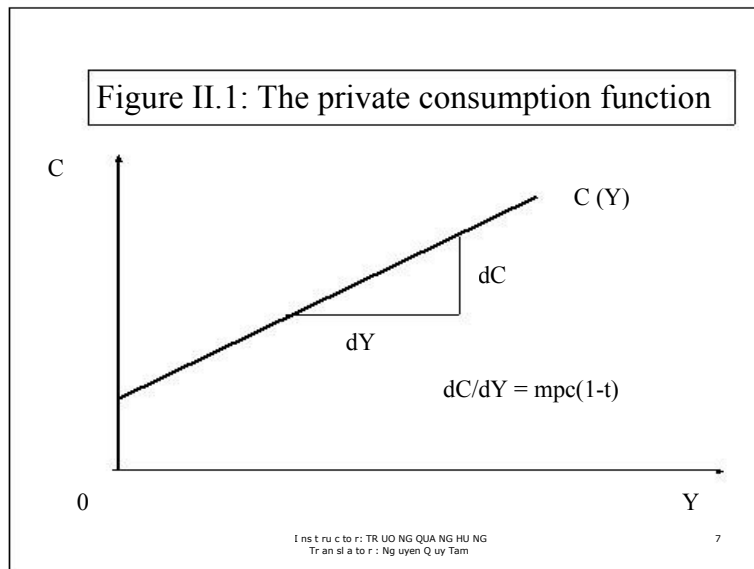




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### III. Aggregate demand

#### III.1 Aggregate demand

$$\text{III.1.1 } Y_D = C + I + G$$

$$\text{III.1.2 } Y_D = \{C_0 - \text{mpc} \cdot T_0 + \text{mpc}(1-t)Y\} + I_0 + G_0$$

$$\text{III.1.3 Call } A_0 = C_0 - \text{mpc} \cdot T_0 + I_0 + G_0$$

$$\text{III.1.4 } Y_D = A_0 + \text{mpc}(1-t)Y$$

III.1.5 Total autonomous consumption  $A_0$  is part of aggregate demand and does not depend on income



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## IV. Determine equilibrium output

### IV. 1 Determine equilibrium output

$$IV.1.1 Y = Y_D$$

$$IV.1.2 Y = A_0 + mpc(1-t)Y$$

$$IV.1.3 Y = A_0 / \{1-mpc(1-t)\}$$

### IV. 2 Saving and investment

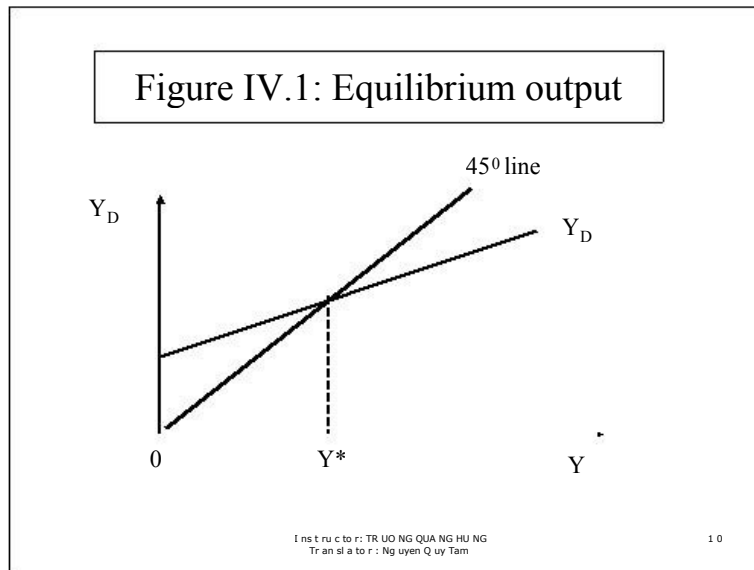
$$IV.2.1 I = S$$

$$IV.2.2 I = -C_0 - G_0 + mpcT_0 + \{1-mpc(1-t)\} Y$$

$$IV.2.3 Y = A_0 / \{1-mpc(1-t)\}$$

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9

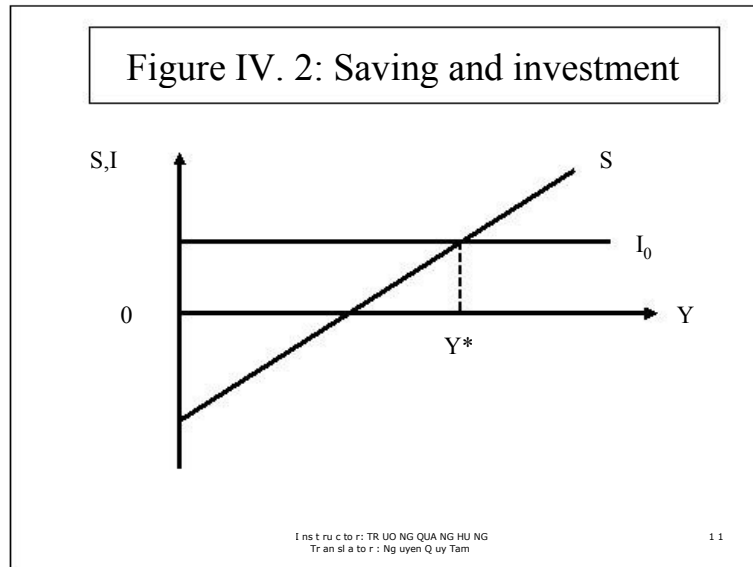




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## V. Autonomous consumption multiplier

### V.1 Autonomous consumption multiplier

$$V.1.1 \quad dY^* = dA_0 / \{1 - mpc(1-t)\}$$

$$V.1.2 \quad dY^*/dA_0 = 1 / \{1 - mpc(1-t)\} > 1$$

### V.2 Explain why the multiplier is larger than 1

| Change | Expenditure        | Production         | Distribution       |
|--------|--------------------|--------------------|--------------------|
| 1      | $dA_0$             | $dA_0$             | $dA_0$             |
| 2      | $mpc(1-t)dA_0$     | $mpc(1-t)dA_0$     | $mpc(1-t)dA_0$     |
| 3      | $mpc^2(1-t)^2dA_0$ | $mpc^2(1-t)^2dA_0$ | $mpc^2(1-t)^2dA_0$ |

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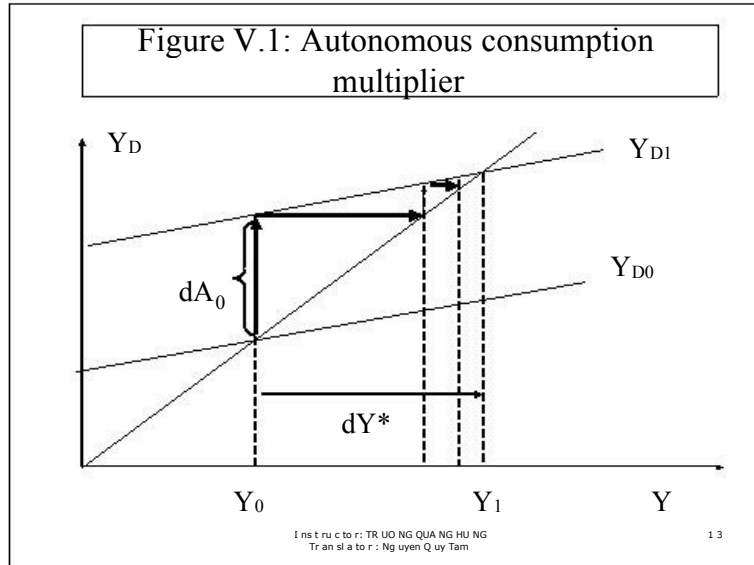
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## VI. Fiscal policy (1)

### VI.1 Fiscal policy goals

VI.1.1 Increase income, create jobs, reduce inflation in SR

VI.1.2 Long run growth

### VI.2 Fiscal policy instruments

VI.2.1 Change in government purchase (G)

VI.2.2 Change in tax (T)

### VI.3 Proportional tax as an automatic stabilizer

VI.3.1  $d(dY^*/dA)/dt = -mpc/[1-mpc(1-t)]^2 < 0$

VI.3.2 Implications of building a tax system

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14



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## VI. Fiscal policy (2)

### V.1 Multipliers of fiscal policy instruments

$$V.1.1 \frac{dY^*}{dG} = \frac{1}{1 - mpc(1-t)} > 1$$

$$V.1.2 \frac{dY^*}{dT} = \frac{-mpc}{1 - mpc(1-t)} < 0$$

$$V.1.3 \frac{dY^*}{dG} = \frac{dY^*}{dT} = \frac{(1-mpc)}{1 - mpc(1-t)}$$

### V.2 Fiscal policy and budget

$$V.2.1 dFB = dT - dG$$

$$V.2.1 dFB = \left\{ \frac{t-1}{1-mpc(1-t)} - 1 \right\} dG$$

### V.3 Deficit and government debt

V.2.1

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15

## VI. fiscal policy (3)

### VI.1 Issues of active fiscal policy

#### VI.1.1 Time lag

#### VI.1.2 Uncertainty: how precise is economic forecasting.

#### VI.1.3 Deficit issue

#### VI.1.4 Fiscal policy and individual prediction formulation about future

#### VI.1.5 Political economics of fiscal policy

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16





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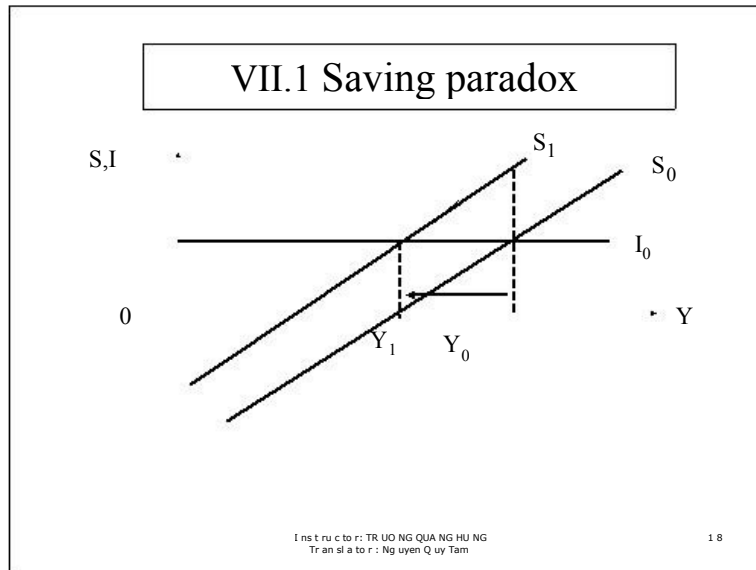
## VII. Saving paradox

### VII. Saving paradox

$$S \rightarrow C \rightarrow Y_D \quad Y \quad S$$

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17



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## VIII. Goods market and the IS curve

### VIII.1 Investment and interest rate:

$$\text{VIII.1.1} \quad I = I_0 - br ; r > 0 ; b > 0 \text{ and } I_0 > 0$$

### VIII.2 IS relationship

$$\text{VIII.2.1} \quad \{ (Y, r) : Y = C(Y-T) + I(r) + G \}$$

$$\text{VIII.2.2} \quad Y = A_0 - \text{mpc}(1-t)Y - br$$

$$\text{VIII.2.3} \quad \{ 1 - \text{mpc}(1-t) \} dY = dA_0 - b.dr$$

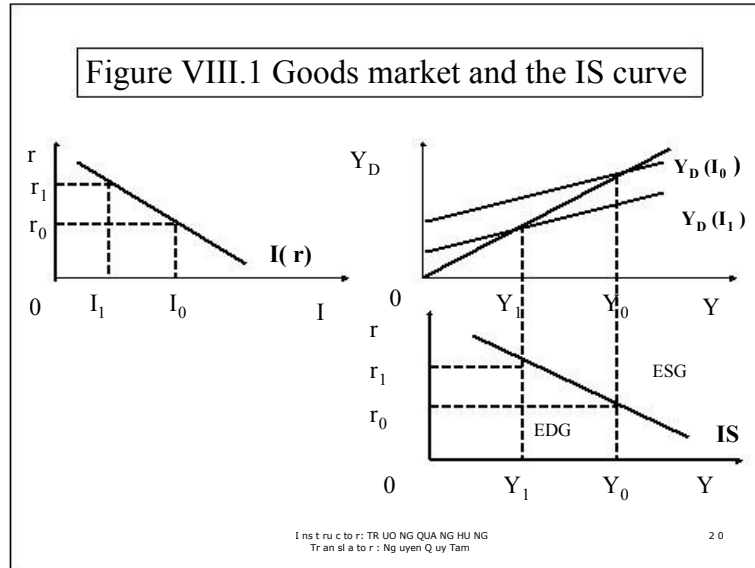
### VIII.3 IS slope

$$\text{VIII.3.1} \quad dr/dY = \{ 1 - \text{mpc}(1-t) \} / -b < 0$$

### VIII.4 Shift of the IS curve

$$\text{VIII.4.1} \quad dY = \{ 1 / (1 - \text{mpc}(1-t)) \} dG_0$$

$$\text{VIII.4.1} \quad dY = \{ -\text{mpc} / (1 - \text{mpc}(1-t)) \} dT_0$$



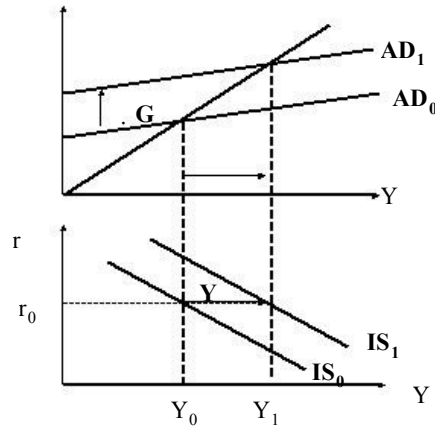


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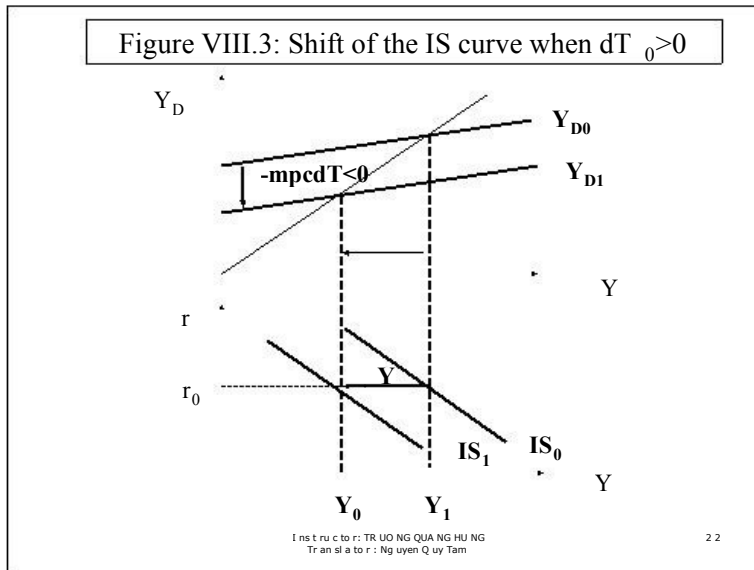
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Figure VIII.2: Shift of the IS curve when  $dG > 0$



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21







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## VIII. Summary of the IS curve

VIII.1 The slope of the IS curve is negative

VIII.2 IS slope expresses a negative relationship  
between income and the interest rate

VIII.3 The IS curve shifts when there is  
change in  $A_0$ , that includes  $G_0$  or  $T_0$ ,  
the IS curve shifts to the right.

VIII.4 Points on the right of the IS curve ESG and  
points on the left of the IS curve EDG

I n s t i t u t e f o r T R A D I N G Q U A N T I T Y  
T r a n s l a t o r : N g u y e n Q u y T a m

23

**B. THE MONEY MARKET  
AND THE LM CURVE**



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## I. Money supply

### I.1 Money supply

$$I.1.1 \text{ MOQ} = C + DD + TD$$

$$I.1.2 \text{ MOQ} = \text{NFA} + \text{NDC}_G + \text{DC}_P + \text{OIN}$$

### I.2 Monetary base

$$I.2.1 \text{ MB} = C + R$$

$$I.2.2 \text{ MB} = \text{NFA}_B + \text{NDC}_G + \text{NDC}_{\text{COB}} + \text{OIN}$$

### I.3 Relationship between MOQ and MB

$$\text{MOQ} = f(\text{MB})$$

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25

## II. Money multiplier

### II.1 Definitions

II.1.1 Money supply:  $MOQ = C + DD + TD$

II.1.2 Monetary base:  $MB = C + R$

II.1.3 Cash ratio:  $c = C / (DD + TD) = \text{const} (0 < c < 1)$

II.1.4 Reserve requirement ratio:

$$r = R / (DD + TD) = \text{const} (0 < r < 1)$$

### II.2 Money multiplier

II.2.1  $dMOQ = m \cdot dMB$ .

II.2.2  $m = (c + 1) / (c + r)$  is called the money multiplier

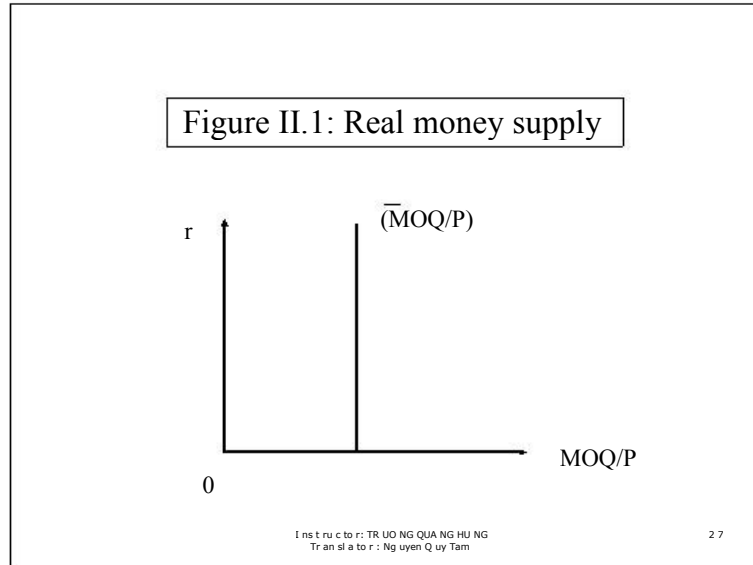
II.2.3  $dMOQ = m(c, r)(dNFA_{cb} + dNDC_g + dNDC_{cob})$



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### III. Money demand and money market equilibrium

#### I.1 Asset limit and portfolio options

$$I.1.1 \quad W = M + B$$

$$I.1.2 \quad W = M_D + B_D$$

$$I.1.3 \quad W = M_S + B_S$$

$$I.1.4 \quad (M_D - M_S) = (B_S - B_D)$$

$$I.1.5 \quad (M_D/P - M_S/P) = (B_S/P - B_D/P)$$

#### II.2 Money demand

$$II.2.1 \quad M_D/P = L(Y, r); L_Y > 0 \text{ and } L_r < 0$$

#### II.3 Money market equilibrium

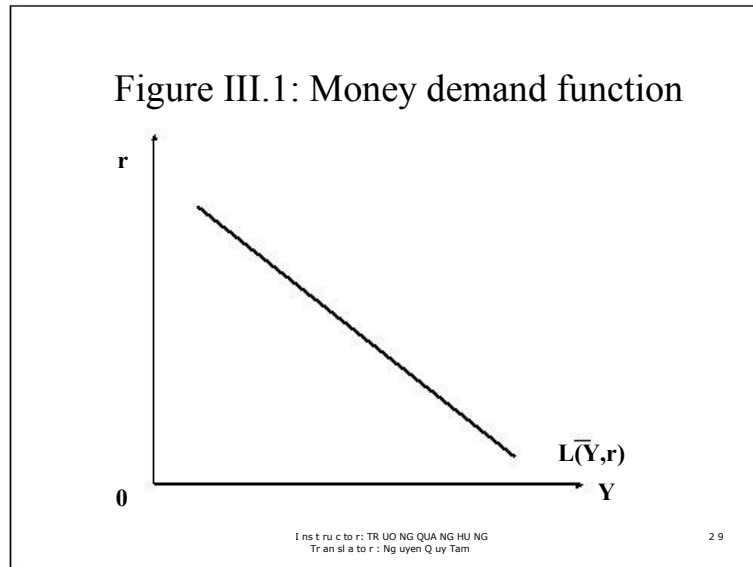
$$II.3.1 \quad M_D/P = L(Y, r)$$

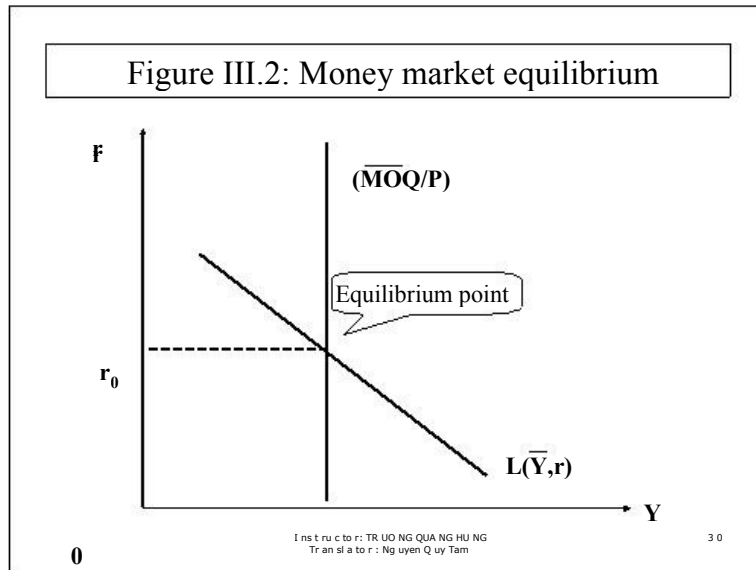


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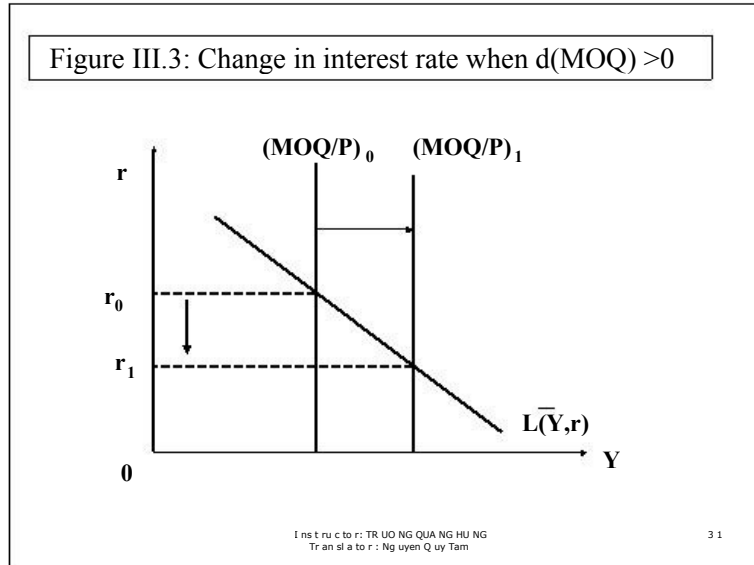
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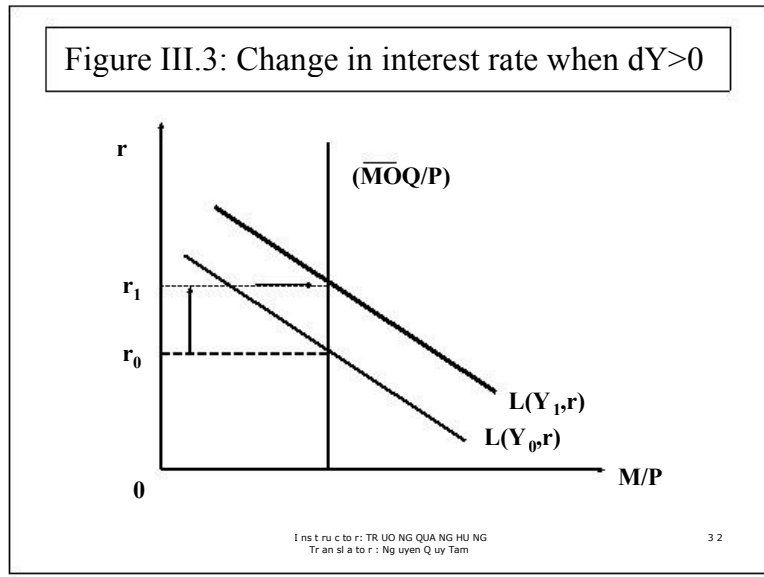


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### III. Money market and the LM curve

#### III.1 Money market equilibrium

$$\text{III.1} \quad \text{MOQ/P} = L(Y, r)$$

$$\text{III.2} \quad \text{MOQ/P} = kY \text{ hr}; k > 0 \text{ and } h > 0$$

#### III.2 LM relationship

$$\text{III.2.1} \quad \{ (Y, r) : \text{MOQ/P} = L(Y, r) \}$$

$$\text{III.2.2} \quad \text{MOQ/P} = kY \text{ hr} \quad + -$$

$$\text{III.2.3} \quad d(\text{MOQ/P}) = k.dY \text{ h.dr} = 0$$

#### III.3 Slope of LM curve

$$\text{III.3.1} \quad dr/dY = k/h > 0$$

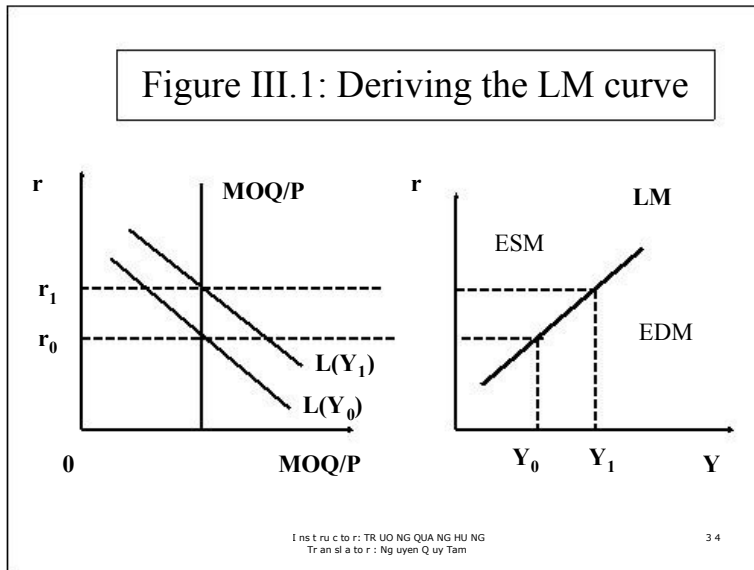
#### III.4 Shifts of LM curve

$$\text{III.4.1} \quad dr = - d(\text{MOQ})/h < 0$$

$$\text{III.4.2} \quad dr = (k/h).dY > 0$$

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T r a n s l a t o r : N g u y e n Q u y T a m

33

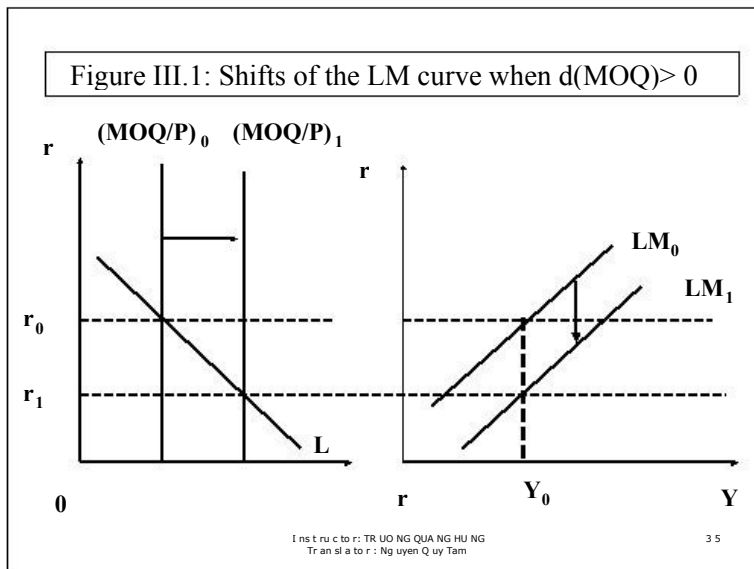




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#### IV. Summary on the LM curve

- (1) The slope of the LM curve is positive
- (2) It has a positive relationship with  $k$  and a negative relationship with  $h$
- (3) The LM curve shifts as a result of change in  $MOQ$ . An increase in  $MOQ$  shifts the LM curve downward
- (4) Points on the right of the LM EDM and on the left of the LM EDG

I n s t r u c t o r : T R U O N G Q U A N G H U N G  
T r a n s l a t o r : N g u y e n Q u y T a m

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C. THE SHORT-RUN  
EQUILIBRIUM:  
IS-LM Model

## I. IS-LM Model

$$I.1 \quad \left\{ \begin{array}{l} Y = C(Y-T) + I(r) + G_0 \quad (IS) \\ (MOQ/P) = L(Y,r) \quad (LM) \end{array} \right.$$

I.2 Endogenous variables: Y, r

I.3 Exogenous variables: P, MOQ, T, G

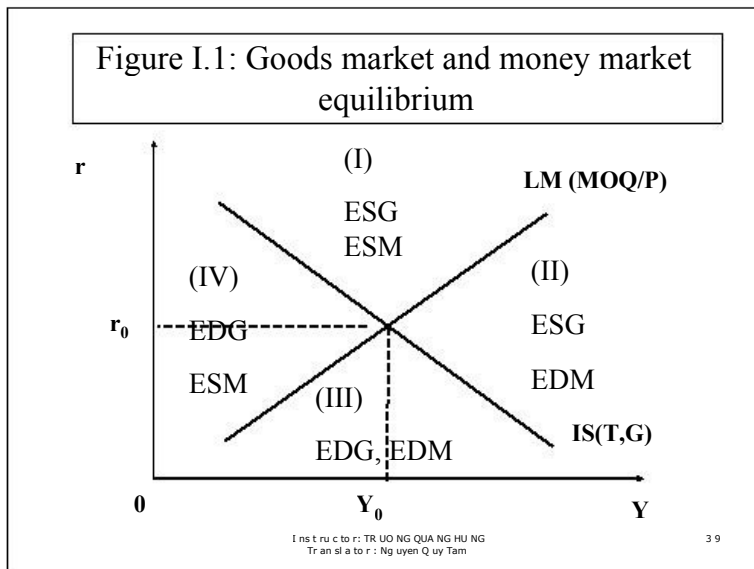




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## II. Adjustment mechanism

II.1 Adjustment mechanism is based on two hypotheses:

II.1.1 Y increases against EDG and Y decreases against ESG

II.1.2 r increases against EDM and r decreases against ESM

II.2 Adjustment mechanism

II.2.1 Sector I: Y and r decrease

II.2.2 Sector II: Y decreases and r increases

II.2.3 Sector III: Y and r increase

II.2.4 Sector IV: Y increases and r decreases

III.3 Adjustment mechanism under flexible money market



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## III. Monetary policy

### III.1 Monetary policy instruments

#### III.1.1 Open market operation

#### III.1.2 Reserve requirements

#### III.1.3 Discount interest rate

#### III.1.4 $d(MOQ) = m(c,r)(dNDC_G + dNDC_{COB})$

### III.2 Adjustment mechanism

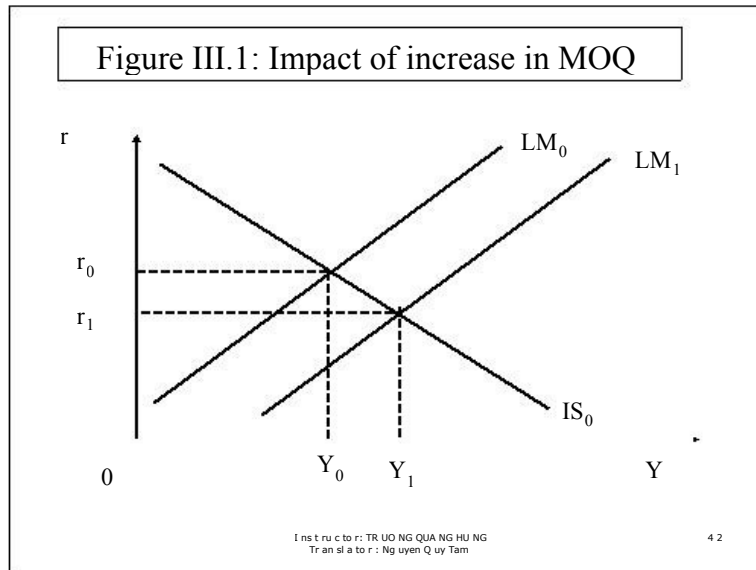
#### III.2.1 . money money supply surplus buy

bonds . bond price . interest rate

. I . output

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## IV. Effect of monetary policy

IV.1 Monetary policy is effective when real money demand is not sensitive to changes in interest rate

$$\frac{\partial \text{MOQ}}{\partial r} < 0, \quad I < 0, \quad Y > 0$$

IV.2 Monetary policy is not effective when money demand is completely elastic against interest rate

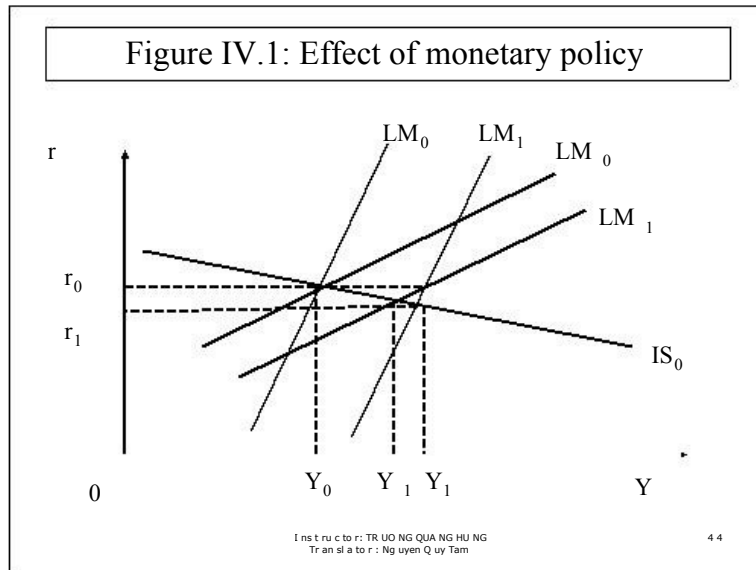
(Liquidity trap)

Increase in  $(\text{MOQ}/P)$   $r$  unchanged  $Y$   $D$  and  $Y$  also not affected

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## V. Fiscal policy

### V.1 Adjustment mechanism

$$(1) \quad \begin{matrix} \cdot G \text{ or } \cdot T \rightarrow \cdot Y_D \\ \cdot I \quad \cdot Y \end{matrix} \quad \cdot Y \quad \cdot L \quad \cdot r \quad \cdot$$

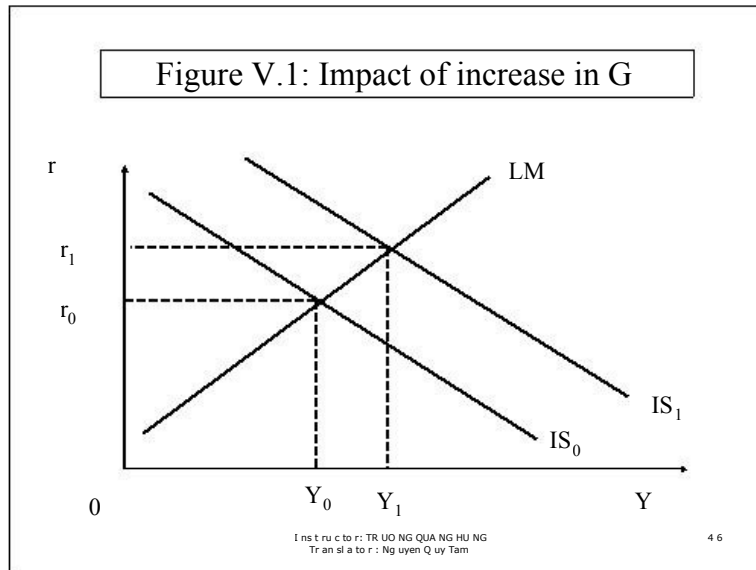
### V.2 Crowding-out Effect

$$(1) \quad \cdot G \quad \cdot L \quad \cdot r \quad \cdot I$$

Government spending is crowding out private investment

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## VI. Effect of fiscal policy

VI.1 Fiscal policy is effective when investment is not sensitive to changes in interest rate

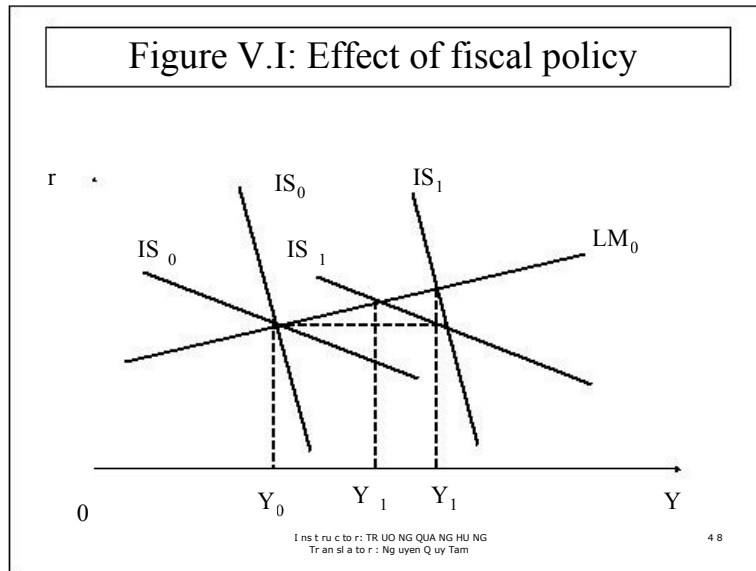
$\cdot G \cdot Y \cdot L \cdot r$  I unchanged Y unchanged

VI.2 Fiscal policy is not effective when real money demand is not sensitive to changes in interest rate

$\cdot G \cdot Y \cdot L$  strongly  $\cdot r$  strongly  $\cdot I$  strongly  $\cdot Y$

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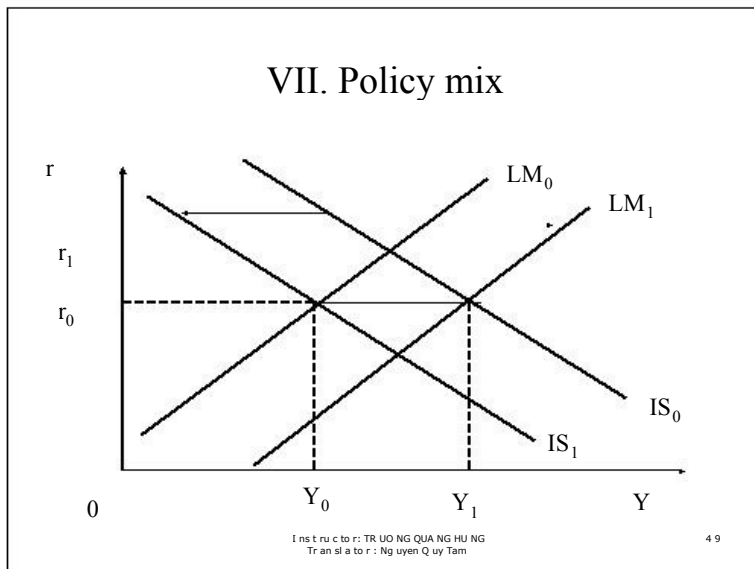




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## VII. Exogenous shocks in the IS-LM model

### VII.1 Shock to the IS curve

- (1) Instinct of investors and expectation of future profit
- (2) Confidence of consumers in the prospect of the economy

### VII.2 Shock to the LM curve

- (1) Change in nominal money demand (exogenous) as financial innovation

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T r a n s l a t o r : N g u y e n Q u y T a m

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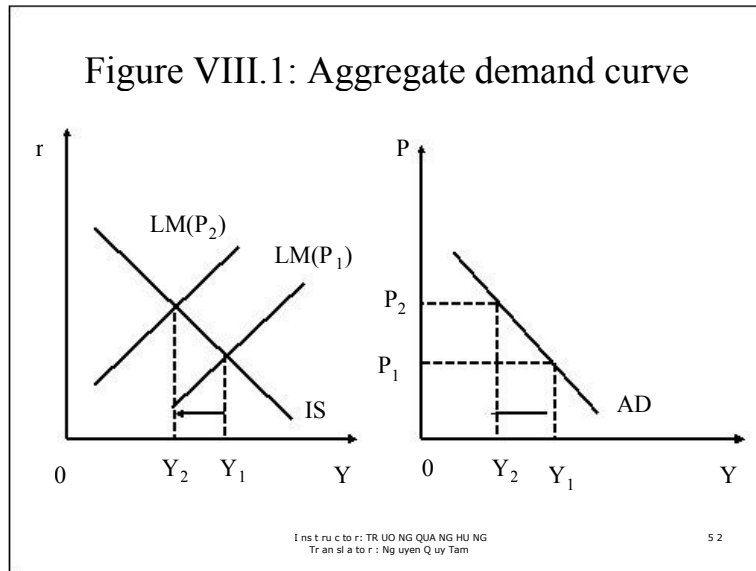
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## VIII. Limit of the IS-LM model

- (1) Static model, thus ignores time lag in policy analysis
- (2) The model cannot show us impacts of aggregate demand on price and output
- (3) Based on fixed price assumption the model cannot analyze inflation.

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T r a n s l a t o r : N g u y e n Q u y T a m

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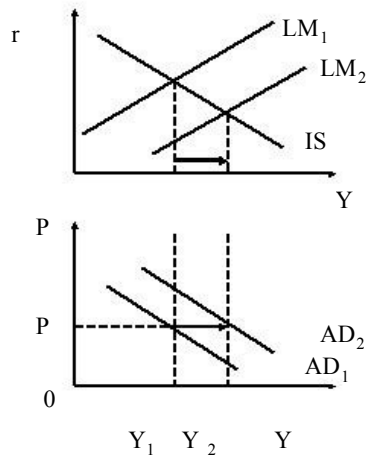


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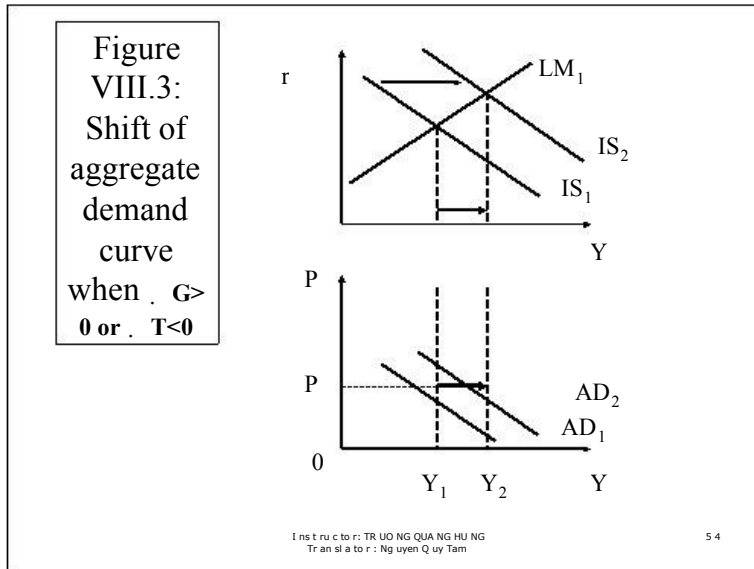
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Figure VIII.2: Shift of aggregate demand curve when  $dMOQ > 0$



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53







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Macroeconomics

Lecture 1

## Macroeconomics: Principles and Reasoning

### Session 1

Outline points to examine in this session.

Why study economics and particularly macroeconomics.

It affects us, our society in a very direct way: our standard of living

We want to understand more about a major subject regularly discussed in our society and in the world.

In doing so, we may contribute, in a more effective way and with more chance of success, to our society in our position as decision makers at the central, provincial, local levels

#### A. What is the main object of macroeconomics.

Analyze the behavior of the economy in its aggregates, such as output, employment, inflation,

exchange

Determine the causes of economic fluctuations in the short term and the medium term, and of economic growth in the long term

Recommend, design, and implement appropriate policies to reduce economic fluctuations (stabilization policy) and to promote economic growth.

## **B. What are the relations between micro and macro**

1. From micro to macro: a unified continuum of economics study.  
Microfoundations of macroeconomics attempts to explain macroaggregates behavior on the behaviors of individual consumers and firms.

Examples:

Aggregate individual consumption to aggregate consumption  
function :  $C = C(YD)$

Aggregate individual firm investment to aggregate investment  
function :  $I = I(r)$



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Lecture 1

Flexible prices in good market and labor market determine the aggregate supply in the medium- and long term.  
Sticky prices determine the aggregate supply in the short term

#### Wages and prices

. Wage rigidities from institutional characteristics, such as contract

. Price rigidities from market considerations, such as menu cost,

## 2. Why macro is relative more complex than micro.

Micro is mainly concerned with one market: demand and supply of mobile phones

Macro involves interactions of several markets; the outcome in one market affects another market and so on.

An increase in oil prices affects the good market through lower production of goods, which reduces the demand workers in the labor market, which reduces their incomes, incomes, and their demand for goods, which reduces further the production of goods.

### 3. Macro and micro in action

The necessity of integration of micro and macro leads to the necessity of coordination for efficient policy implementation.. Lack of coordination was a major cause of the precipitous fall in output in the former Comecon countries

- . Macro provides the framework within which micro is implemented.
- . National objectives and policy instruments provide the general framework for firms and provincial project implementations. Example of inconsistency in national investment which is lower than planned provincial investment ( illustrated by ICOR).
- . IMF provides the macro framework for project financing from the WB or the ADB

### C. Course objectives

1. Enhance skills for macroeconomic analysis and policies to real life issues.
2. Polish macroeconomic reasoning as a language



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### 3. What do you like to obtain from the course.

. Effective, professional, competent responses to economic questions in interviews for jobs, press, radio, etc.

#### **D. Overall strategy**

Emphasize the principles and the methodology for guidance through the intricacies of macroeconomic reasoning. Objective: aiming at moving from basics to high level of competence in economic reasoning to satisfy the challenge of diversity through establishment of common core knowledge.

#### **E. What are possible instruments.**

1. Supply from resources of a knowledgeable and experienced teaching team
2. Demand from participants through intense individual focus and stamina to understand, memorize, explain subject
3. Interactions between teaching team and participants
  - a. Lectures focus on main points owing to prior reading by participants.



- b. Exercises individually written
  - c. Regular review: in each session, scheduled sessions, individual appointments
  - d. Possible group appointments for one topic of common interest
4. Facilitation through study groups, exchanges and discussions on subject matters with colleagues;

Mutual support for learning from colleagues of diverse backgrounds

**How to study economics.**

The general process to study science applies to study of economics. Attempt to explain what we observe through theories.

We theorize routinely, without we know it. Modeling is formalization of our theory for explanation observations and testing of and prediction from our theory.



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By building model to formalize our theory which is an attempt to explain what we observe and serve as a base for our prediction, therefore as guide for our policies.

### **F. Road map**

1. Using the approach of objectives and instruments
2. Revisiting basic macroconcepts.
3. Representing an economy: real, fiscal, money, balance of payments to permit full appreciation of linkages.
4. Elaboration on and experiment with macropolicies and linkages for stabilization
- 5 Economic growth and structural policies

### **G. General concepts of objectives and instruments**

- 1. Tinbergen s Principle: Number of instruments must equal number of objectives for the latter to be achieved**

**. Systems of 2 (n) equations and 2 (n) unknowns.**

2. Main objectives of macroeconomic management: maximize output, minimize inflation, a certain amount of foreign exchange reserves.

3. Instruments: monetary policy (MP), fiscal policy (FP), and external policy (BOPP: trade policy, exchange rate policy)

4. Relative market efficiency classification: direct the instrument toward the objective where it has a relative efficiency: monetary policy to fight inflation and fiscal policy to increase aggregate demand.

**H. Revising basic macro concepts**

**1. Price index**

CPI= consumer price index;  $q_0P_1/q_0P_0$

WPI= wholesale price index

GDP deflator=  $q_1P_1/q_0P_0$



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## **2. Real and nominal GDP**

GDP at constant prices= 1993. Meaning  
GDP at nominal prices

## **3. Foreign exchange reserve= foreign assets ( banking system)**

## **4. Exchange rate definitions**

Unit of one domestic currency in terms of foreign currencies

**Unit of one foreign currency in terms of domestic currencies**

## **5. Short term, medium term, and long term**

In general:

- a. The definition of the short term, medium term, and long term varies according to the context of analysis.
- b. Usually, short term is less than one year, medium term is less than 3 years, and longer term is more than 3 years, such as with financial instruments, e.g. bonds.

- c. Medium term may be longer if one considers the repayment period for loans extended by the Fund in some of its lending programs.

**For our course**

d. Short term: period of time when the physical amount of K and L are fixed, but the intensity of utilization may vary through working more hours, and actual price  $P$  is different from expected  $P_e$ , leading to fluctuations in **output. Short term may be more than 1 year.**

e. Medium term: period of time when physical amount K and L are fixed, and actual price  $P$  is equal to expected  $P_e$ , leading to the natural rate of **output**

f. Long term: period of time when physical amount K accumulates, L increases due to population growth and technology progresses, leading to LT economic growth.

**I. Flexible and sticky prices**





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Flexible price clear a markets by equating demand and supply and everyone is satisfied, the market is in equilibrium. This is the point of reference in economics.

The problem arises when market is in disequilibrium because sticky prices causes either excess demand or excess supply, leading to dissatisfaction by at least one group. This dissatisfaction must be resolved until equilibrium is reestablished by what. By the ingeneous concept of expectations of being **flexible to adjust to actual outcome.**

Thai Van Can

6



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Macroeconomics

Lecture 2

## Macroeconomics Principles and Reasoning

### Session 2: Stylized Representation of the Economy

#### I - REAL SECTOR

##### A. O UTPUT AND SUPPLY

Given the inputs: amount of capital  $K$  and amount of labor  $L$ , the existing production technology determines output. The relation between inputs and output is expressed in the production function:

$$(1.1) Y_s = F \left( \underset{+}{K}, \underset{+}{L} \right)$$

$K$  and  $L$  vary in the long-term but in the short-term they may be considered fixed,  $\bar{K}$ ,  $\bar{L}$   
They are inputs in the production process to produce the natural rate of output

$$(1.2) \bar{Y}_s = F(\bar{K}, \bar{L})$$

*Due to difference between actual price  $P$  and expected price  $P_e$ , output may deviate from the natural rate of output and  $Y_s$  may be expressed as:*

$$(I.3) Y_s = \bar{Y}_s + a (P - \bar{P}_e)$$

### **B. Demand for Output**

Output is used for consumption  $C_d$ , investment  $I_d$ , government expenditure  $G_d$ , exports  $X$

$$(I.4) Y_d = C_d + I_d + G_d + X$$

The economy also imports goods and nonfactor services to augment supply and to satisfy demand

$$(I.5) M = C_f + I_f + G_f$$

Add (5) to (4):

$$(I.6) Y_d + M = C_d + I_d + G_d + X + C_f + I_f + G_f$$

$$C = C_d + C_f$$



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Academic year 2005-2006

Macroeconomics

Lecture 2

$$I = I_d + I_f$$

$$G = G_d + G_f$$

$$(I.7) Y_d = C + I + G + X - M$$

### C. Equilibrium condition

$$Y_s = Y_d = Y$$

$$(I.8) Y = C + I + G + X - M$$

Define  $X - M = NX$

$$(I.9) Y = C + I + G + NX$$

$Y$  = Gross Domestic Product, GDP

$C$  = Consumption is a function of disposable income  $YD$

$I$  = Investment

$G$  = Government expenditure

$X$  = Exports of goods and nonfactor ( non K and L) services

$M$  = Imports of goods and nonfactor ( non K and L) services

$$(I.10) C = C(Y, D)$$

Where YD: Disposable income and

$$(I.11) YD = Y - T$$

Where T = Government revenue less Government transfers received by domestic nongovernment sector. T thus represents the net flows of tax paid to the government.

$$(I.12) I = I(r)$$

Where r: real interest rate

**Notes:**

*Relations between aggregate income, aggregate demand and external current account.*

$$Y = C + I + G + X - M$$

Gross National Income:

$$GNI = GNP = Y + FSN = C + I + G + X - M + FSN$$

Gross National Disposable Income:





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$$\text{GNDI} = \text{GNI} + \text{GRT} = \text{Y} + \text{FSn} + \text{GRT} = \text{C} + \text{I} + \text{G} + \text{X} - \text{M} + \text{FSn} + \text{GRT}$$

$$\text{GNDI} - \text{C} - \text{G} = \text{I} + \text{X} - \text{M} + \text{FSn} + \text{GRT}$$

Since  $\text{GNDI} - \text{C} - \text{G} = \text{S}$

and  $\text{X} - \text{M} + \text{FSn} + \text{GRT} = \text{CA}$

$$\mathbf{S - I = X - M + FSn + GRT = CA}$$

## II. Fiscal Sector

Fiscal Balance

$$(II.1) \text{FB} = \text{T} - \text{G}$$

If  $\text{T} > \text{G} \Rightarrow \text{FB} = \text{surplus}$

If  $\text{T} < \text{G} \Rightarrow \text{FB} = \text{DEFicit}$

Take the usual case

$$(II.2)$$

DEF=

Where

-

(II.2.1)  $G = G_0$

(II.2.2)  $T = tY$

*Deficit may be financed by only 2 sources: domestic and foreign.*

DEF= Domestic Bank Financing + Domestic Borrowing + Foreign Grants + Foreign Borrowing (debt)

(II.2.3)  $DEF = NDC_g + BRW_g + GRT_g + D_g$

Or

**(II.2.4)  $NDC_g = DEF - (BRW_g + GRT_g + D_g)$**

#### Notes

Pay attention to the sign convention in most fiscal tables:  $FB + Financing = 0$ , if  $FB = DEF$   
 $DEF + Financing = 0$   $DEF = - Financing$ .



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This means that the financing of the fiscal deficit is presented with a sign opposite to the **deficit**.

### III. Monetary Sector

The monetary sector is broadly represented by the banking sector which consists of the central bank and commercial banks. The balance sheet of the central bank, the consolidated balance sheet of the commercial banks, and the consolidation of those two balance sheets into the monetary survey for most countries may be found in the *International Finance Statistics (IFS) published by the IMF*.

The monetary survey balance sheet is broadly represented by:

$$(III.1) \text{ MOQ} = \text{NFA} + \text{NDCg} + \text{DCp} + \text{OIN}$$

Broad Money = Net Foreign Assets + Net Domestic Credit To The Government + Domestic Credit To The Private Sector + Other Items Net

$$\text{MOQ} = \text{Broad Money} = \text{Money} + \text{Quasi Money}$$

$$\text{NFA} = \text{Net Foreign}$$

Assets= FA less FL  
 NFA = NFAcb + NFA cob  
     NFAcb= NFA of central bank  
     NFA cob =NFA of commercial banks

NDCg = Net domestic credit to the government  
 DCp = Domestic credit to the private sector  
 OIN = other items net= other items assets less other items liabilities

The above identity represents the amount of broad money where money supply is equal to money demand

### **Money supply**

**(III.2) (MOQ/P)s= m(MB/P)**

Where:

m = money multiplier

MB = Monetary base consisting of currency in circulation (CC) and reserve requirements (RR) deposited by commercial banks at the central bank.

MB = CY + Rdd + Rtd; on the liabilities side



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$$MB = NFA_{cb} + NDC_{g.cb} + DC_{cob}$$

*NDC<sub>g.cb</sub>* = net credit to government from central bank

DC<sub>cob</sub> = credit to commercial banks from central bank

*Money supply may be assumed to be given for the moment:*

$$(III.3) (MOQ/P)_s = (MOQ/P)_0$$

**Money demand**

$$(III.4) (MOQ/P)_d = L(i, Y)$$

Equilibrium condition at a given time:

$$(III.5) (MOQ/P)_s = (MOQ/P)_d = MOQ/P$$

From (III.3)

$$MOQ/P = (MOQ/P)_0$$

Since at a given time,  $P$  is the same for the real money balance



Since at a given time,  $P$  is the same for the real money balance ~~equilibrium and supplied balance~~ is given by the identity above.

One also have the definition relation:

$$(III. 6) \text{MOQ} \times v = P \times Y$$

or

$$P = (\text{MOQ}/Y) \times v$$

#### IV. Balance of Payments (BOP)

##### Definition

The BOP records transactions on goods, nonfactor services, factor services, transfers, financial operations between residents and nonresidents of a given country, that is between residents of a country and the residents of the rest of the world.

##### Recording convention

Receipts or inflows are recorded with a positive (+) sign.

Payments or outflows are recorded with a negative (-) sign.

Transactions are recorded on a gross basis whenever possible



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Methodology for compiling BOP statistics: Balance of Payments Manual, 5<sup>th</sup> Ed.,  
Washington DC: IMF)

Data sources

Office of National Statistics for national statistics and international comparable data in  
*Balance of Payments Statistics published by the IMF.*

**The BOP identity:**

**(IV.1)  $BOP = X M + FS_n + GRT + FDI + BRW_g + CFO + EO = .NFA$**

Where:

.NFA = change in NFA

X = exports of goods and nonfactor (non K and L) services

$X = XG + XNFS$

M = imports of goods and nonfactor (non K and L) services

$M = MG + MNFS$

FS net = receipts from resident factors K and L less payments to non resident factors K and L

$FS_n = KSVC\ net + LSVC_n$

GRT = Total Grants Net

$GRT = GRT_p + GRT_g$

GRT<sub>p</sub> = Grants net received by the private sector

GRT<sub>g</sub> = Grants net received by the government

FDI = foreign direct investment in resident country (+); direct investment of resident country abroad (-)

BRW<sub>g</sub> = borrowing by resident government from nonresident countries (+)

CFO = other capital flows

EO = errors and omissions

|                                                                                      |                                                 |
|--------------------------------------------------------------------------------------|-------------------------------------------------|
| $X(e) - M(e) + FS_n + GRT_p + RT_g + FDI(r-r^*) + BRW_g + CFO(r-r^*) + EO + NFA = 0$ |                                                 |
| <b>Current Account<br/>(CA)</b>                                                      | <b>Financial accounts or capital flows (CF)</b> |

$CA = X - M + FS_n + GRT_p + GRT_g$

$CF = FDI + BRW_g + CFO + EO + NFA$



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The balance on the external current account is financed by capital flows. More explicitly, an external CA deficit (-) is financed by a capital inflow (+) and an external CA surplus (+) is financed by a capital outflow (-)

$$CA = -CF$$

In absolute terms: no sign

$|CA(e)| = |CF(r-r^*)|$ ; this is equation (3) in Mankiw5, p. 375

#### Notes

Pay attention to the sign convention in most BOP tables: the financing of the BOP balance **(deficit)**, **.NFA**, is presented with a sign opposite to the balance (deficit).

The concept of above the line and below the line (= financing) may be arbitrary but usually, the line is drawn after the EO terms.

#### V. Interest Rates

Nominal interest rate = real interest rate + expected inflation rate

$$(V.1) i = r + \pi^e$$

Where

$i$  = nominal interest rate

$r$  = real interest rate

$\pi^e$  = **expected inflation rate (l.m pht d. tnh)**

## VI. Exchange rates

Real exchange rate = nominal exchange rate x the ratio of domestic price over foreign price.

$$(VI.1) e = e \times (P/P^*)$$

where

$e$  = real exchange rate = ratio of the prices of domestic goods over the prices of foreign goods = terms of trade

$e$  = nominal exchange rate = ratio of the price of domestic currency over the price of foreign currency

$P$  = Prices of domestic goods

$P^*$  = Prices of foreign goods

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so, the price of one unit of domestic currency in terms of foreign currency.

An increase (decrease) in  $e$  or  $e$  means that  $e$  or  $e$  appreciates ( depreciates), indicating that the competitiveness of the economy vis a vis the rest of the world may decrease (increase). Note the exchange rate will then be no longer  $e$  or  $e$ , but will be replaced by the equivalent concept of Real effective exchange rate (REER), nominal effective exchange rate and.

#### Notes

The above conclusions are reversed if the definition of the nominal exchange rate is reversed. This is the usual case where the nominal exchange rate is expressed as one unit of foreign currency in terms of domestic currencies, such as  $US\ 1 = D15,000$ . Thus, if  $US\ 1 = D15, 500$ , the Dong has depreciated.

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# ECONOMIC GROWTH

## Lecture 6

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1

# A. ECONOMIC GROWTH ISSUES

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PER CAPITA INCOME AMONG RICH  
COUNTRIES  
( Dollar 1992 )

|         | 1950   | 1998   | 1998/1950 |
|---------|--------|--------|-----------|
| France  | 5,150  | 19,158 | 3.7       |
| Germany | 4,356  | 20,059 | 4.6       |
| Japan   | 1,820  | 19,907 | 10.9      |
| US      | 11,170 | 25,890 | 2.3       |
| England | 6,870  | 19,005 | 2.8       |

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| RICH COUNTRIES GROWTH RATE (%) |           |           |
|--------------------------------|-----------|-----------|
| Country                        | 1950-1973 | 1973-1998 |
| France                         | 4.2       | 1.6       |
| Germany                        | 4.9       | 1.8       |
| Japan                          | 8.1       | 2.5       |
| US                             | 2.2       | 1.5       |
| England                        | 2.5       | 1.9       |

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## STANDARDS OF LIVING: 1999

| Country | Per capita income<br>(US dollars) |
|---------|-----------------------------------|
| US      | 31,910                            |
| Japan   | 25,170                            |
| Germany | 23,510                            |
| Mexico  | 8,070                             |
| Russia  | 6,990                             |
| India   | 2,230                             |
| Nigeria | 770                               |

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## FACTORS OF ECONOMIC GROWTH

Why one country grows faster than others.

Why growth rate varies from time to time in one country.

Why has there been no convergence of living standards globally.

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## WHY ECONOMIC GROWTH

### Poverty Reduction

1/5 poorest countries in the world

Infant mortality rate 200/1000

Calorie consumption is 1/3 of the rich

Pakistan's average income is \$2 per day

African countries are poorer

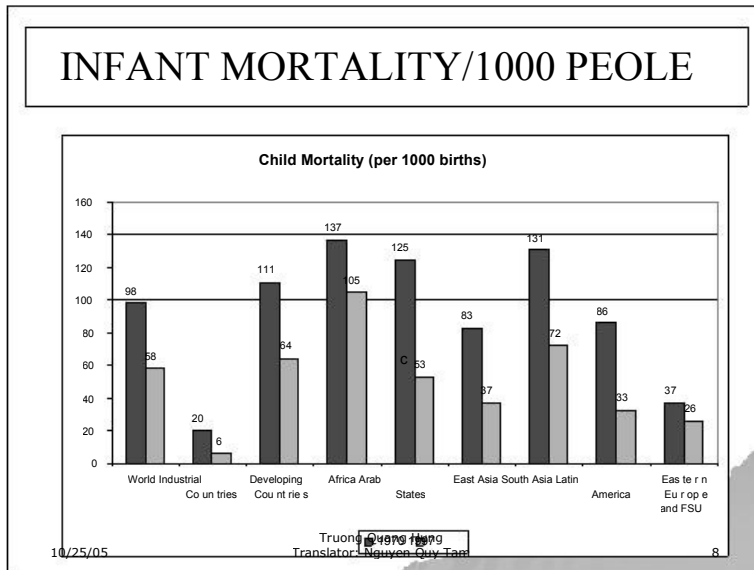
of the poorest countries has suffered hunger for  
more than 3 decades

### Jobs creation

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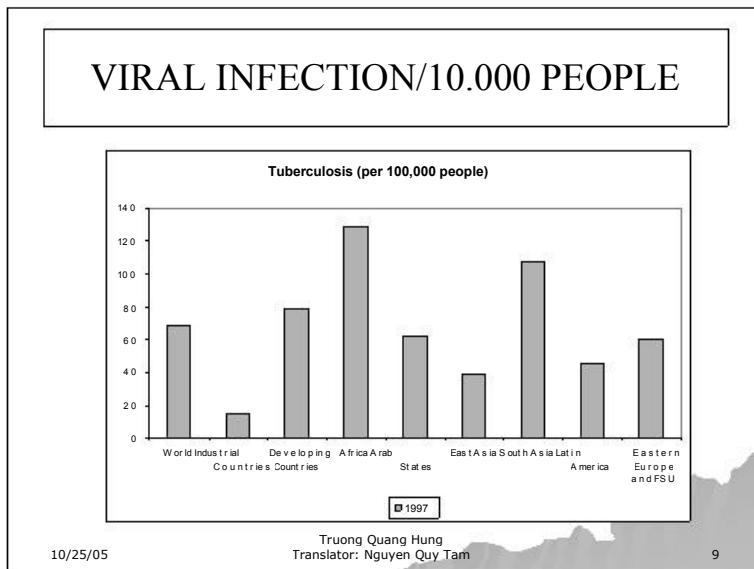
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## ECONOMIC GROWTH MEASURES (1)

### (1) Real GDP growth rate per capita

$$(1.1) g_{\text{GDP}} = \frac{\Delta \text{GDP}}{\text{GDP}_{t-1}} = \frac{d \ln \text{GDP}}{dt}$$

### (2) Measurement issues

(2.1) do not reflect quality of environment,  
health and education

(2.2) living standard associated with final  
consumption not production

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## GROWTH ACCOUNTING CALCULATION

### (3) Growth rate of a product of two variables

$$(3.1) Z_t = X_t \cdot Y_t \quad g_Z = g_X + g_Y$$

### (4) Elastic coefficient

(4.1) Production function  $Y = K^a L^{(1-a)}$

(4.2) Elasticity of Y to K or ratio of K to income

$$a = d\ln Y / d\ln K = MPK \cdot K / Y$$

(4.3) Elasticity of Y to L or ratio of L to income

$$(1-a) = d\ln Y / d\ln L = MPL \cdot L / Y$$

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**B. SOLOW GROWTH MODEL**

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# SOLOW GROWTH MODEL

Robert Solow

Basic model

For policy making

Benchmark for growth theory study

Show determinants of growth and standards of living over time

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## ASSUMPTIONS

L and K change

Investment changes K

Population raises L

Population growth rate ( $g_L$ ) and saving rate (s) are exogenous

Consumption and saving functions are linear

$S = s \cdot Y$  and  $C = (1-s) \cdot Y$

S, C: savings and consumption spending

s: saving rate

Closed economy

$G = 0$  and  $T = 0$

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## PRODUCTION FUNCTION

Production function

$$Y = F(L, K)$$

$$MPL = \partial Y / \partial L > 0 \text{ and } \partial^2 MPL / \partial L^2 < 0$$

$$MPK = \partial Y / \partial K > 0 \text{ and } \partial^2 MPK / \partial K^2 < 0$$

$$tY = F(tL, tK) ; t > 0$$

Production function by labor

$$Y/L = F(K/L, 1) ; t=1/L$$

$$y = f(k)$$

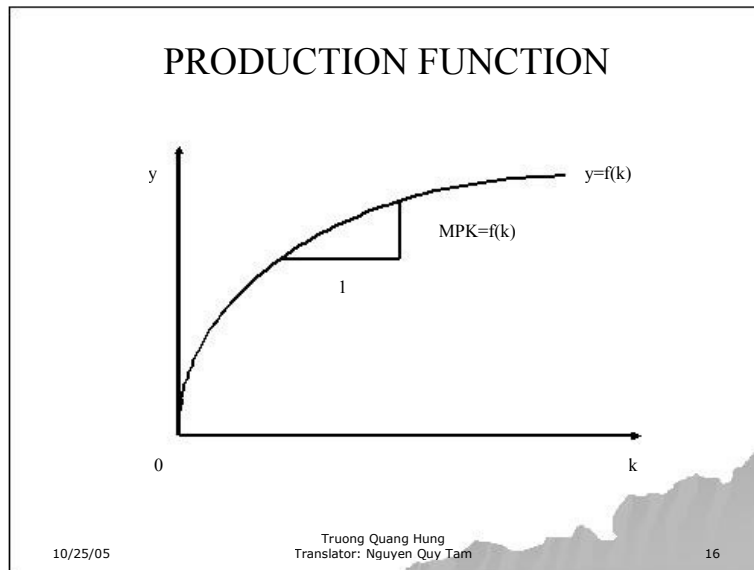
$$MPK = \partial y / \partial k = \partial Y / \partial K > 0$$

$$\partial^2 y / \partial k^2 < 0$$

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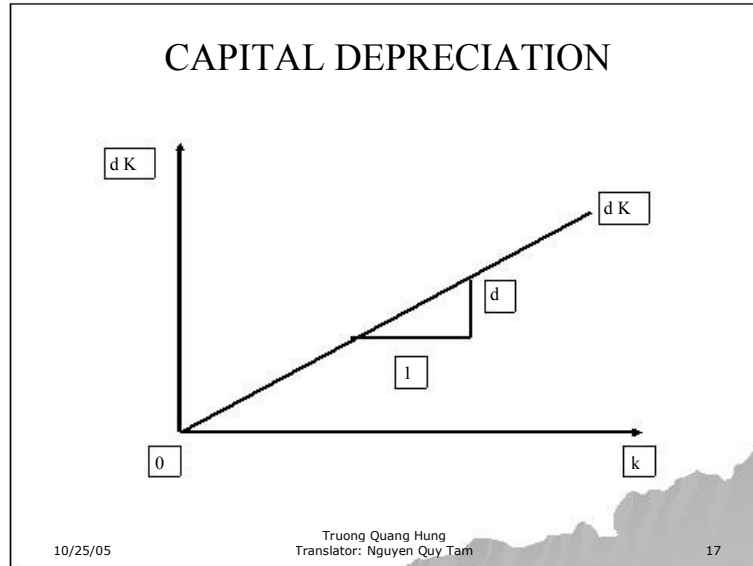
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## SAVING AND INVESTMENT

### Saving and Investment

$$Y = C + I$$

$$Y - C = I$$

$$S = I$$

### Consumption and saving functions

$$S = sY \text{ and } C = (1-s)Y ; 0 < s < 1.$$

### Investment and capital accumulation

$$I = \dot{K} + dK$$

### Saving and investment relationship

$$sY = \dot{K} + dK$$

### Increase K over labor

$$sY = \dot{K} + dK$$

$$sy = \dot{K}/L + dk$$

$$\dot{K}/L = sy - dk$$

$$\dot{k} = sy - dk$$

### Steady state

$$\text{When } sy = dk \Rightarrow \dot{k} = 0. K \text{ is steady now}$$

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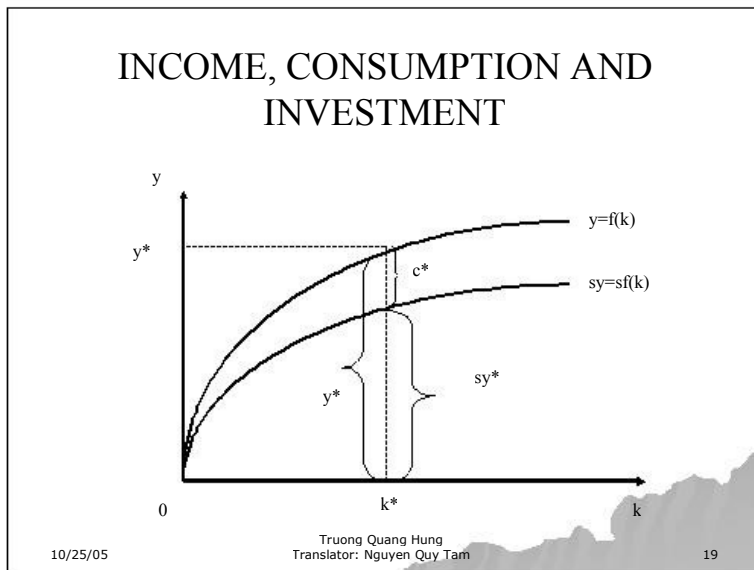
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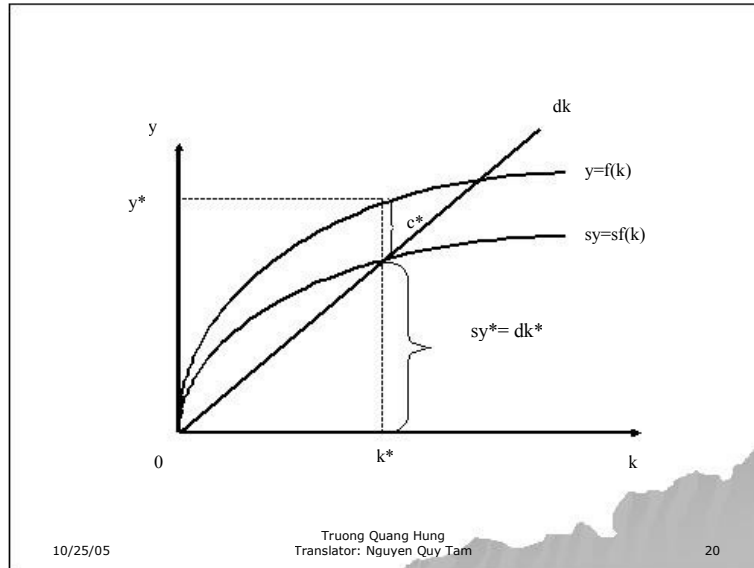


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## STEADY GROWTH

Investment is just enough to replace depreciation

k and y will be stable

$$\dot{k}^* = 0$$

$$s y^* = d k^*$$

$$y^* = f(k^*)$$

In the steady state

The rates of increase in k and y are zero

$$g_k = g_y = 0$$

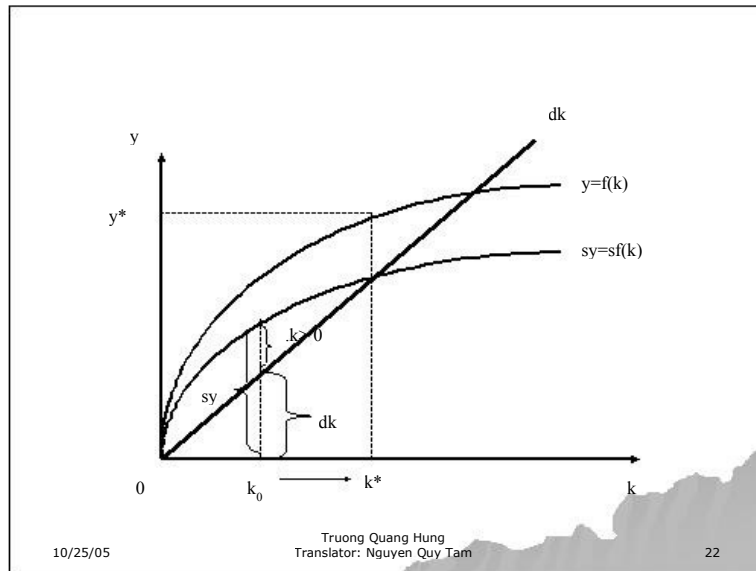
The rates of increase in K and Y are zero

$$g_K = g_Y = 0$$

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21



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## SAVINGS AND GROWTH

Increase saving rate in the economy

k and y go up during adjustment to the new steady state.

In the new steady state

The rates of increase in k and y are zero

$$g_k = g_y = 0$$

The rates of increase in K and Y are zero

$$g_K = g_Y = 0$$

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## SAVINGS AND GROWTH

### Increase in saving rate

Can not explain the sound increase in output and living standard.

Can explain why some countries are rich while others are poor

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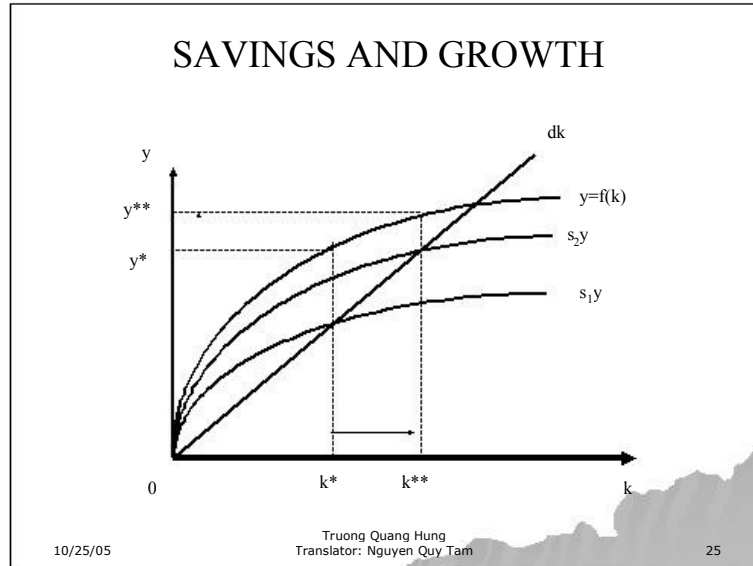
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## THE EFFECTS OF POPULATION GROWTH

### Increase in population growth

k and y go down during adjustment to the new steady state.

### In the new steady state

The rates of increase in k and y are zero

The rates of increase in Y and K =  $g_L$

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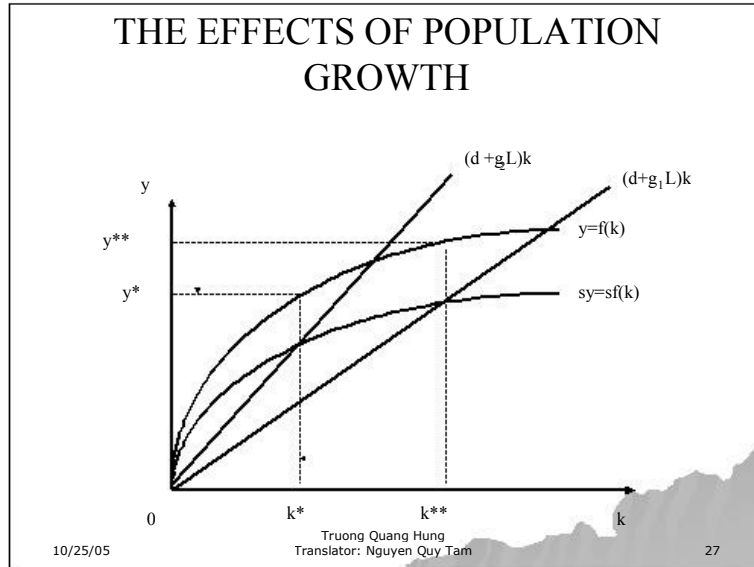
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## THE EFFECTS OF POPULATION GROWTH

### Population growth

Can not explain the sound increase in living standard.

Can explain sustainable output growth

Can explain why some countries are rich while others are poor

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## OPTIMAL GROWTH:

### THE GOLDEN RULE STEADY STATE

Currently, as  $s$  goes up

$c$  goes down

Is  $c^*$  up or down.

If  $c^*$  is up,  $s$  increases such that  $s^*$  reach maximum value.

Optimality

$$\max c^* = f[k^*(s)] - s[k^*(s)]$$

$c^*$  is max when  $MPK = d$

When would  $s$  is up and  $c^*$  is down.

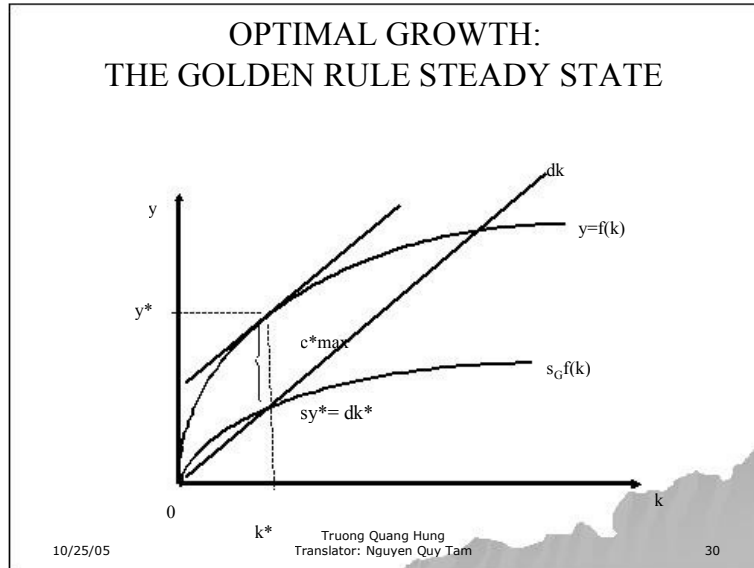
The economy does not seem to move toward the Golden rule steady state. Adjustment of  $s$  is needed to reach this state.

How does consumption change during the adjustment.

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## ECONOMICS AND POLITICS

If  $k^* > k_G$ , the economy is not Pareto optimal  
Fall in  $s$  will bring benefits for both current  
and future generations

If  $k^* < k_G$ , the economy is not Pareto optimal  
Increase in  $s$  will make current consumption less  
but future consumption more.

Policy implications.

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## TECHNOLOGICAL PROGRESS

New knowledge, know-how, new production method that increase output using the same amount of labor and capital inputs

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## TECHNOLOGICAL PROGRESS IN THE SOLOW MODEL

How change in technology.

Production function  $Y = (K, AL)$

$A$  : technology change

$\dot{A}/A = g_A$  : change in  $A$  is exogenous

$AL$ : efficiency of labor

Average production function for efficiency of labor

$$y_E = f(k_E)$$

Change in effective capital /labor stock

$$\dot{k}_E = sy_E - (d + g_L + g_A)k_E$$

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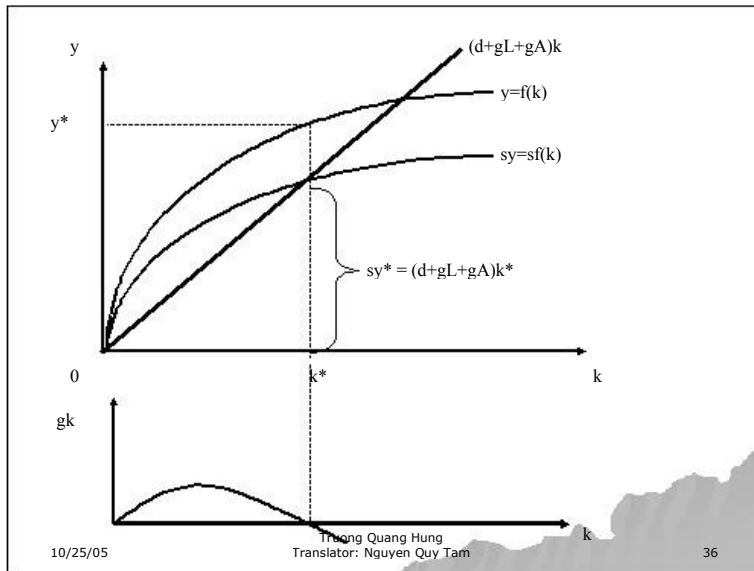
## Steady state or long run equilibrium

$$\dot{k}_E^* = 0 \quad s y_E^* = (d+gL+gA)k_E^*$$

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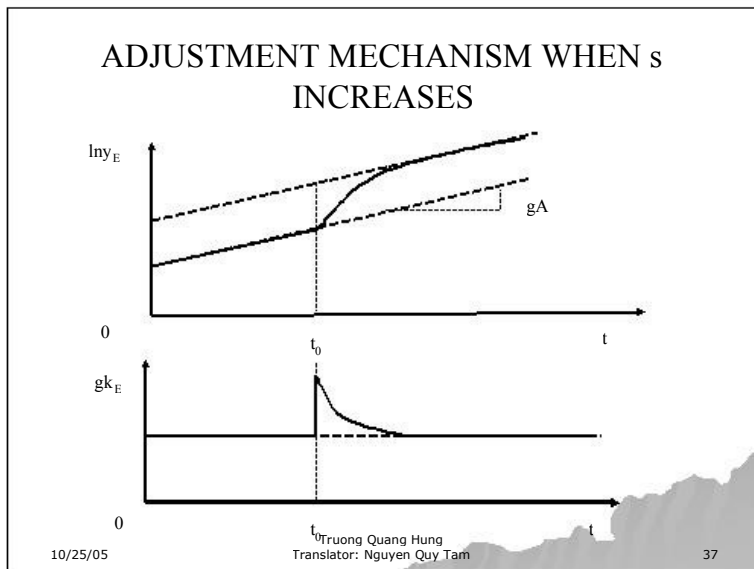


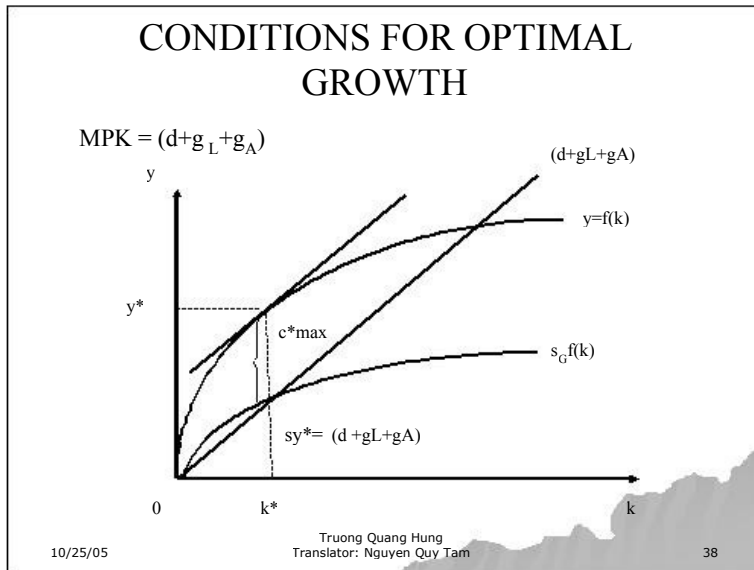


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## ABSOLUTE CONVERGENCE HYPOTHESIS

The hypothesis

Same technology ( $A$ )

Same population growth rate ( $g_L$ )

Same saving rate ( $s$ )

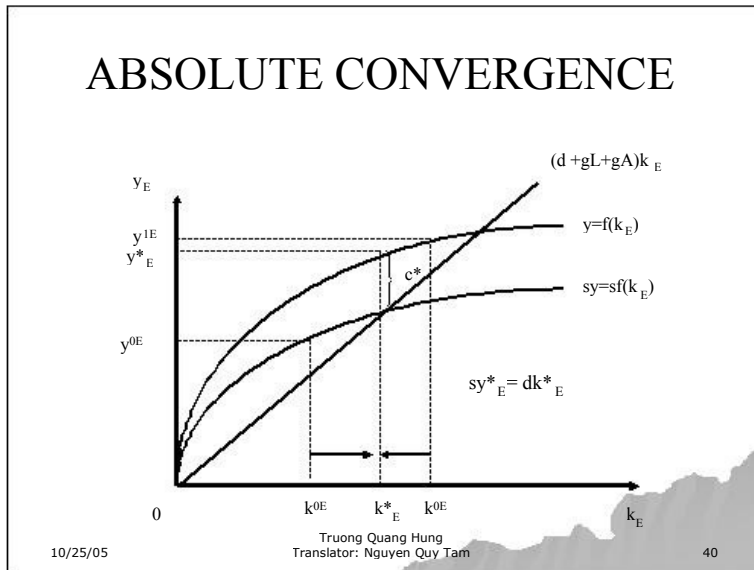
Different capital/Labor ratio ( $k$ )

Expect to have a convergence of per capita  
output and consumption

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## RESULTS OF SOLOW GROWTH MODEL

Increase in savings only have absolute effect  
but not percentage effect in the long run

During adjustment

y and k increase at a faster rate than  $g_A$

Y and K increase faster than  $g_A + g_L$

When it comes to steady state

y and k increase at the same rate of  $g_A$

Y and K increase at the same rate of  $g_A + g_L$

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Long term growth depends on technological change

Convergence of per capita outputs among the rich and the poor

Question:

what factors that make future generation live a better life.

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## ASSESSMENT OF SOLOW MODEL

Can not explain source of tech. progress

Can not provide a framework for public policy  
analysis on long-term growth

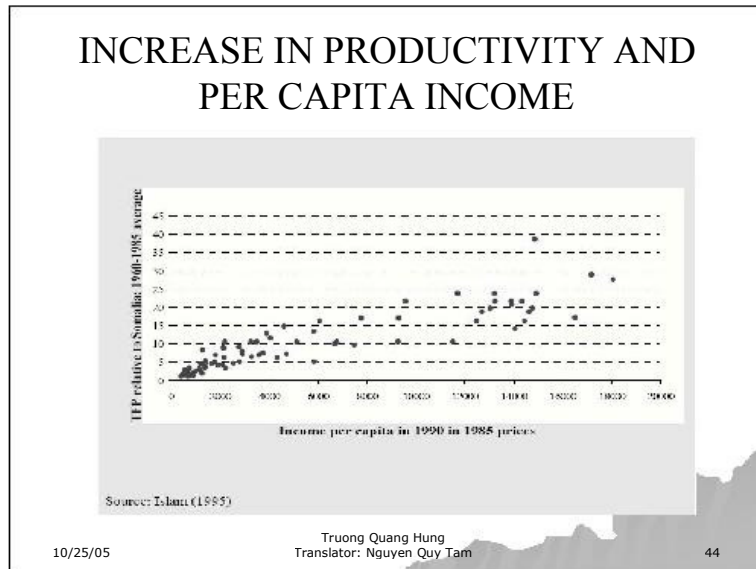
Can not show relationship between trade and long-  
term growth

The convergence hypothesis in the Solow model  
occurs only when there is similarity among nations,  
except per capita income

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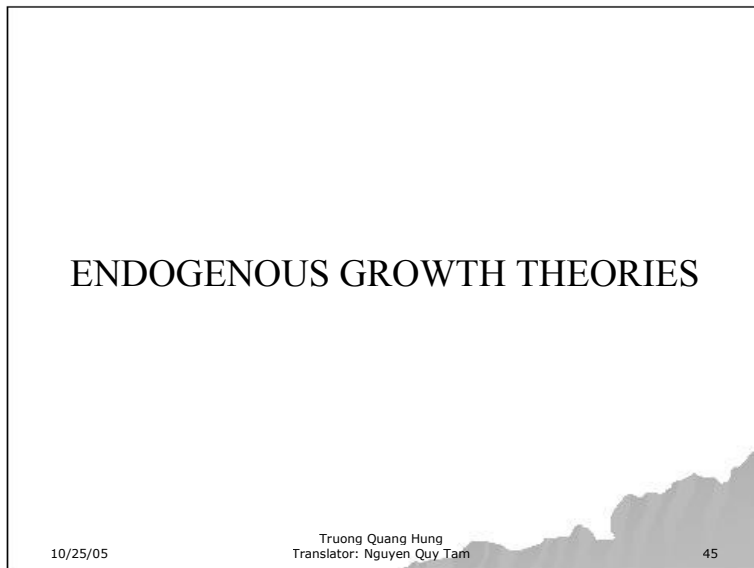
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## NEW THEORY OF GROWTH

Learning-by-doing model (Arrow, 1962) and  
(Sheshinski, 1967)

Separate knowledge out of labor as another type of capital.

Denote amount of knowledge as  $A$

Amount of knowledge is a function of physical capital

Knowledge creates spillover effect

$$A = f(K) = K^{(1-a)}$$

Model

$$Y = KL^{(1-a)}$$

$$gY = sr - (1 - a)g_L$$

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## Model of human resource

Human capital: skills, personal knowledge

Human capital is competitive and rather isolated  
(spillover effect is low)

Human capital increases through education and  
training.

## Model

$$Y = K^a H^{(1-a)}, \text{ where } H = h.L$$

$$Y = K (H/K)^{(1-a)} = AK$$

$$g_Y = s.r$$

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### **Research & Development model (R&D)**

Cumulative knowledge living standards  
**improvement**

Knowledge Cumulative via R&D

Profit: motive for firms investment in R&D

R&D results: new knowledge, products, production  
**methods, and product quality improvement**

### **Solving conflict between individual and social benefits**

Externalities in competitive markets

What government should do to provide incentive for  
**R&D spending.**

Consideration between incentives for innovation and  
**spillover effect of knowledge**

Why economic performance is different among  
**countries.**

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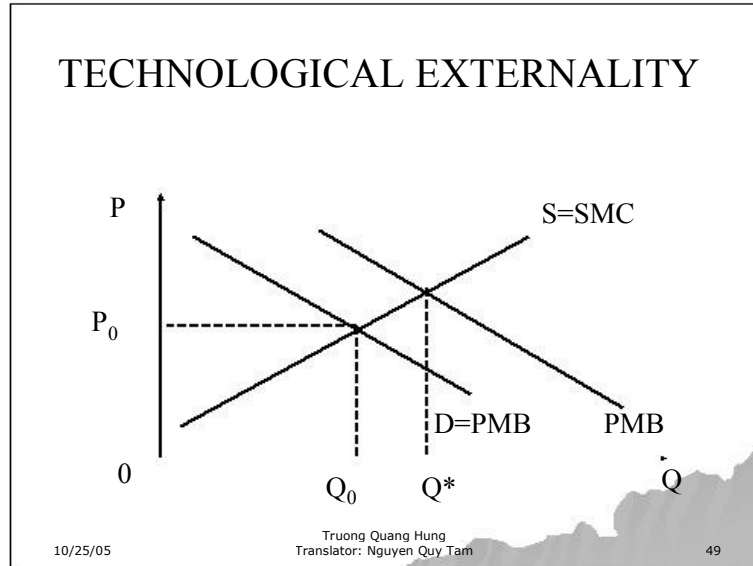
48



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What can governments do to promote firm innovation.

patents protection

subsidy to private R&D spending

provisions of venture capital to firm innovation

Consideration of invention incentive and knowledge spillover

- Time limited protection of patents

- Special medicine, diagnostic, therapeutic and surgical methods for the treatment of human

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Why adaptation of new technology is different  
among slow-poke countries.

Lack of access to new technology and knowledge.

Inability to access new technology and  
knowledge.

Institution.

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Is dissemination of new technology desirable.

New invention destroys old ones

Owners of previous inventions are not benefited

They want to use political power to prevent  
dissemination of new technology or research  
financing in order to protect own interests

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## CONCLUSION

Endogenous models focus on the importance  
of creating a good environment for firm  
innovation

via R&D for new products

by using technology from advanced countries

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**MEASURING ECONOMIC  
GROWTH**

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## MEASURING ECONOMIC GROWTH

Solow proposed how to calculate contribution of factors to growth

$$Y = K^a (AL)^{(1-a)}$$

$$\ln Y = a \ln K + (1-a)[\ln A + \ln L]$$

$$(1-a)\ln A = \ln Y [a \ln K + (1-a)\ln L]$$

$$TPF = g_Y [a g_K + (1-a)g_L]$$

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## GROWTH MEASUREMENT AMONG EASTASIAN COUNTRIES

| <u>Country</u> g | $Y(\%)$ ag | $K(\%)$ (1-a)g | $L(\%)$ g | $A(\%)$ |
|------------------|------------|----------------|-----------|---------|
| Korea            | 8,3%       | 4,30%          | 2,50%     | 1,50%   |
| Malaysia         | 6,8%       | 3,40%          | 2,50%     | 0,90%   |
| Singapore        | 8,1%       | 4,40%          | 2,20%     | 1,50%   |
| Thailand         | 7,50%      | 3,70%          | 2,00%     | 1,80%   |
| Indonesia        | 5,60%      | 2,90%          | 1,90%     | 0,80%   |

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## US GROWTH MEASUREMENT

**$gY(\%)$   $agK(\%)$   $(1-a)gL(\%)$   $gA(\%)$**

|           |       |       |       |       |
|-----------|-------|-------|-------|-------|
| 1950/1999 | 3,60% | 1,20% | 1,30% | 1,10% |
| 1950/1960 | 3,30% | 1,00% | 1,00% | 1,30% |
| 1960/1970 | 4,40% | 1,40% | 1,20% | 1,80% |
| 1970/1980 | 3,60% | 1,40% | 1,20% | 1,00% |
| 1980/1990 | 3,70% | 1,20% | 1,60% | 0,90% |

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## CONVERGENCE OR DIVERGENCE.

### Solow MODEL

Marginal product of capital goes down per capita outputs between the rich and the poor will converge

### Endogenous growth model

Marginal product of capital is unchanged or goes up per capita outputs between the rich and the poor will diverge

### Empirical data

Conditional convergence

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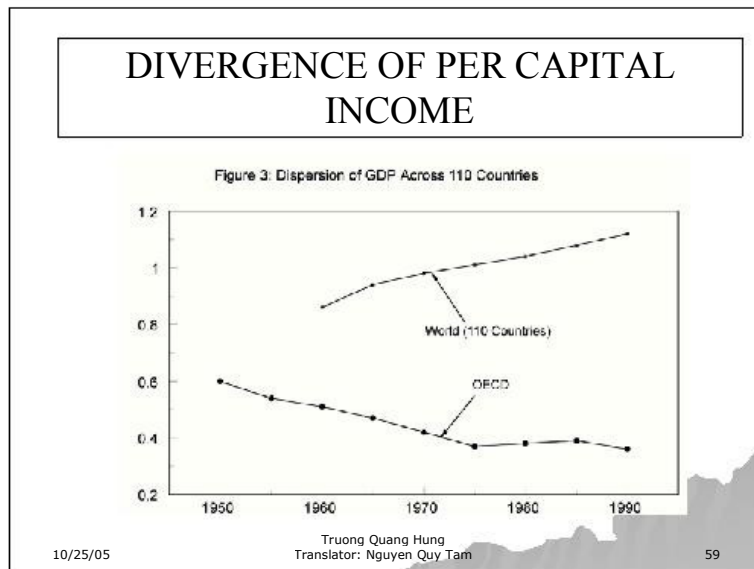
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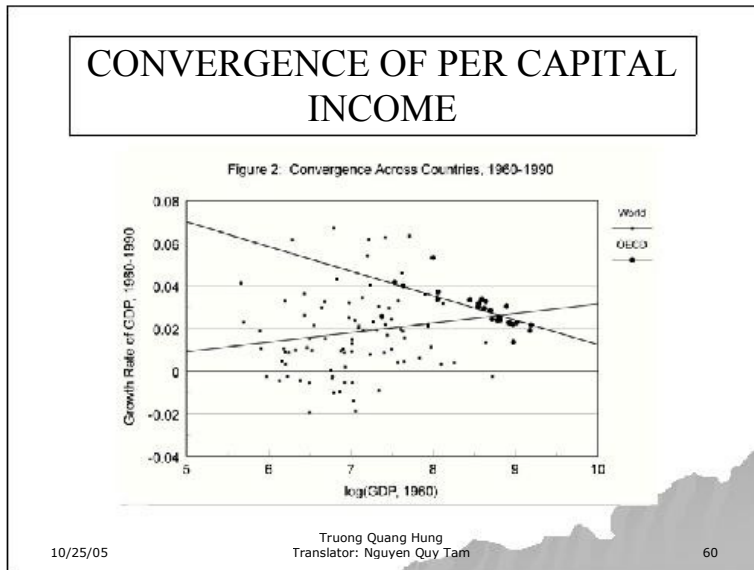


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### ECONOMIC GROWTH AND TECHNOLOGICAL PROGRESS IN RICH COUNTRIES, 1950-1987

| Country | Per capita increase in output |       |        | Technological change (%) |       |        |
|---------|-------------------------------|-------|--------|--------------------------|-------|--------|
|         | 50-73                         | 73-87 | Change | 50-73                    | 73-87 | Change |
| France  | 4                             | 1.8   | -2.2   | 4.9                      | 2.3   | -2.6   |
| Germany | 4.9                           | 2.1   | -2.8   | 5.6                      | 1.9   | -3.7   |
| Japan   | 8                             | 3.1   | -4.9   | 6.4                      | 1.7   | -4.7   |
| England | 2.5                           | 1.8   | -0.7   | 2.3                      | 1.7   | -0.6   |
| US      | 2.2                           | 1.6   | -0.6   | 2.6                      | 0.6   | -2     |

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## REAL EVIDENCE

### (1) Frankel and Romer, 1999

#### Free trade and FDI promote growth

Adopt foreign advanced technology

Access international capital market

International competition reduces reluctance to R&D spending

Expand market and facilitate specialization

Utilize economies of scale from R&D

Learning through exports

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## REAL EVIDENCE

### (2) Kaufmann, 1999

Law enforcement associated with property rights, legal regulations are closely related to growth

Give incentives to firms and individuals to innovate

### (3) Dixit, 1989

High sunk costs will undermine growth

Preventing new market entries

Discouraging FDI

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## REAL EVIDENCE

### (3) Fischer, 1993

High inflation affects growth

Discourage investment

### (4) Easterly and Rebelo, 1993

Government expenditures and growth are related

Non-production spending that is crowding out private investment and curbing growth

Spending on education and infrastructure that raises productivity will increase growth

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## INSTITUTIONS AND GROWTH

### (1) Economic growth and social infrastructure relationship

Social infrastructure increase productivity, accumulate physical and human capital increase per capita output

### (2) Appropriate social infrastructure includes institutions and policy that provide a supportive environment to effective production

Encourage capital accumulation, enhance labor skill, transfer of advanced technology

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## INSTITUTIONS AND GROWTH

### INSTITUTIONS AND GROWTH

Enforce law (property rights, regulations, legal system)

Market function (structure, openness, competition policy,  
K, technology..)

Social conflict (growth and equity)

Financial institutions (banking, financial markets)

Government institutions (rent, corruption, red-tape)

Cultural institution (norms, customs)

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## GROWTH POLICY

### I. Basic policy

#### (1) Macro stabilization

$$S-I = CA$$

Control deficit financing that put pressure on inflation

Maintain competitive real exchange rate

#### (2) Human capital accumulation

Market disability and role of government in education

A meritocratic society that rewards individual talents

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## GROWTH POLICY

### (3) Open to foreign technology

Purchase patents

Attract FDI

Train experts abroad and use experts from abroad  
(oversea Vietnamese)

learn management experience and business practices

### (4) Promote export

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## GROWTH POLICY

### (4) Limit price distortion

Price must reflect production costs, not limit imports,  
monopoly, nor direct pricing

Promote competition and develop infrastructure

Legal foundation for contract

### (5) Effective and stable financial system

Encourage savings and direct savings to productive  
activities

### (6) Minimize bias towards agriculture

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## GROWTH POLICY

### II. Institution

- (1) Legal enforcement (property rights, legal regulations, legal system )  
to secure private and foreign investment
- (2) High quality bureaucracy that has capacity and power to defend its policy making  
High wage to attract qualified manager  
Management procedure should be institutionalized  
Create relevant social status  
Avoid pressure by interest groups

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