Updated 14th March 2006

B202: Macroeconomic Theory and Policy: The Open Economy and Introduction to Growth Economics

Lecturer: Wendy Carlin, Drayton House, Room 216
Outline for Part 2, Spring 2006

This term’s part of B202 is concerned with the open economy and with the economics of growth. You will frequently need to make use of the closed economy analysis covered in the autumn term. Please refer to the B202 website for copies of the course information and for updates on times and references. News relevant to the course will be posted regularly on the web page.

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Lecture Slots: Monday 12-1 and 4-5 every week; Thursday 2-3 (see below for details) Chemistry Auditorium

Tutorial Classes: There are six classes this term. Required course-work consists of problem sets to hand in for classes 1, 2, 3 and 6; prepared answers, which are not be handed in for class 4 and an essay for class 5.

<table>
<thead>
<tr>
<th>Week</th>
<th>Week beginning</th>
<th>Hand-in on Thursday at noon work for</th>
<th>Classes</th>
<th>Lectures on Thursday 2-3</th>
<th>Lectures</th>
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<tr>
<td>1</td>
<td>9th Jan</td>
<td></td>
<td>Ordinary Lecture</td>
<td>L1-L6: Short-run analysis</td>
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<tr>
<td>2</td>
<td>16th</td>
<td>C1 (short-run)</td>
<td>Ordinary Lecture</td>
<td>L7-L10: Medium-run analysis</td>
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<tr>
<td>3</td>
<td>23rd Feb</td>
<td>C1 (short-run)</td>
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<td>5</td>
<td>6th Feb</td>
<td>C2 (Mundell-Fleming model)</td>
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<td>6 Reading week</td>
<td>13th</td>
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<tr>
<td>7</td>
<td>20th</td>
<td>C3 (full model)</td>
<td>D1</td>
<td>L13-L16: Applications – US, UK, Japan, Eurozone</td>
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<td>8</td>
<td>27th</td>
<td>C4 (no hand-in; prepare answers)</td>
<td>C3 (full model)</td>
<td>D2</td>
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<td>9</td>
<td>6th Mar</td>
<td>C5 (essay)</td>
<td>C4</td>
<td>D3</td>
<td>L17-L20: Growth</td>
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<td>10</td>
<td>13th</td>
<td>C6 (growth)</td>
<td>C5 (policy session)</td>
<td>D4</td>
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<tr>
<td>11</td>
<td>20th</td>
<td>C6 (growth)</td>
<td>D5</td>
<td>No Lectures on Monday</td>
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B202 Spring Term Lecture Schedule

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
<th>Textbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Introduction; opening the goods market</td>
<td>Topic 1. Short run analysis of the open economy</td>
</tr>
<tr>
<td>L2</td>
<td>Nominal and real exchange rates</td>
<td></td>
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<tr>
<td>L3</td>
<td>The real exchange rate, the trade balance and aggregate demand</td>
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<tr>
<td>L4</td>
<td>Opening the financial market: the UIP condition</td>
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<tr>
<td>L5</td>
<td>Current account, capital account &amp; exchange rate regimes; Mundell-Fleming model</td>
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<tr>
<td>L6</td>
<td>Mundell-Fleming model, exchange rate expectations &amp; exchange rate overshooting</td>
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<tr>
<td>L7</td>
<td>Medium-run equilibrium in the open economy: inflation and unemployment</td>
<td>Topic 2. Medium run analysis of the open economy</td>
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<tr>
<td>L8</td>
<td>Deriving the ERU curve in real exchange rate-output space</td>
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<tr>
<td>L9</td>
<td>Putting it all together: ERU, AD and BT</td>
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<tr>
<td>L10</td>
<td>Long-run equilibrium</td>
<td></td>
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<tr>
<td>L11</td>
<td>Aggregate demand and aggregate supply shocks</td>
<td>Topic 3. Shocks &amp; policy responses in the open economy</td>
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<tr>
<td>L12</td>
<td>Examples: EMU &amp; oil shock: external trade &amp; external supply shocks</td>
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Reading Week

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<thead>
<tr>
<th>Lecture</th>
<th>Topic</th>
<th>Textbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>L13</td>
<td>The choice of monetary policy regime: ERM &amp; EMU</td>
<td>Topic 4. Applications of open economy analysis to policy &amp; performance since 1990</td>
</tr>
<tr>
<td>L14</td>
<td>The UK Economy</td>
<td></td>
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<tr>
<td>L15</td>
<td>The US Economy</td>
<td></td>
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<tr>
<td>L16</td>
<td>Japan: analyzing a slump</td>
<td></td>
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<tr>
<td>L17</td>
<td>Growth facts &amp; basic tools</td>
<td>Topic 5. Introduction to growth economics</td>
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<tr>
<td>L18</td>
<td>Solow-Swan model</td>
<td>CS 2006 Chapter 13 Sections 2.1-2.3</td>
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<tr>
<td>L19</td>
<td>Solow-Swan model: transitional dynamics and concepts of convergence</td>
<td>CS 2006 Chapter 13 Section 2.4, Introduction to Section 5</td>
</tr>
<tr>
<td>L20</td>
<td>Introducing technical progress and welfare</td>
<td>CS 2006 Chapter 13 Sections 3, 4, 6</td>
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NB Changes as compared with 2004-5 (this affects the use of old exam papers for revision): omitted from Topic 1 are the extensions to the small open economy case, i.e. large open economy, imperfect capital mobility and imperfect asset substitutability (Section 6 of Chapter 9). Growth is now covered in Term 2 rather than Term 1 as in previous years.

Textbooks

The main text to be used this term is: **CS2006** Wendy Carlin and David Soskice (2006), *Macroeconomics: Imperfections, Institutions and Policies* Oxford: OUP

In addition, you may find some of the chapters in the following helpful as supplementary reading:


This article is a very useful comparison of different monetary policy regimes: F. Mishkin (1999). ‘International experiences with different monetary policy regimes’ *Journal of Monetary Economics* 43, 579-605. [on-line via electronic journals]
Explanation of and advice for this term’s B202 work:

1. In order to work on applied topics (i.e. Topic 4 and your essay), we need to have a working open economy model that covers the short, medium and long run. Because of the proliferation of cases (short, medium, long run; fixed, flexible exchange rates; various shocks; various policies), the most efficient way to teach (and learn) this – in my experience – is to work in a very concentrated way to construct a core model. Although I will refer to empirical evidence and real-world examples, this will play a rather minor role in the first five weeks. I hope the delayed gratification will come once we apply the model to problems of performance and policy after Reading Week.

2. This means you must keep up during the first five weeks as the model is built incrementally. To do this,
   - come to the lectures if you find them useful
   - read the textbook material
   - take notes – you will take notes more effectively if you have skimmed through the chapter beforehand. I will draw diagrams on the overhead projector; following through how this is done should help with understanding.
   - work through the check-list questions at the end of the chapters
   - use the learning objectives to monitor progress and for revision
   - work through the problem sets (go through them again after your class to make sure you understand fully)

3. I will make use of material covered in the first term.

4. After Reading Week, we apply the model to analyze recent policy and performance issues (Topic 4). In a team of 2 or 3, you will look in some depth at an applied problem.

5. The last 4 lectures provide an introduction to the Economics of Growth.

6. The Demonstration Lectures will take place after Reading Week. In each of them, I will work through a set of related questions on a particular topic, e.g. inflation or sectoral imbalances or comparing exchange rate regimes …

7. Make use of the office hours of your TA. If you still have problems or have other questions, come and see me.
Problem Set 1 (to be handed in)

1.1 [10 points]
Assume you are analyzing a small open economy in which wages, prices, the interest rate and the exchange rate are fixed and where there is no government. From an initial position of trade balance, there is a sharp fall in world trade.
How would you model a fall in world trade and why? [1]
Concisely describe the difference between the new and old equilibrium using a diagram and in words. [5]
Rank the changes in consumption, absorption and output. Explain how you worked this out. Your answer should include an explanation of ‘absorption’. [4]

1.2. [15 points]
Assume that wages, prices and the exchange rate are fixed.
(a) Will a fall in the budget deficit due to a cut in government spending always improve the trade balance? Explain your answer. [5]
(b) Compare the size of the ‘balanced budget multiplier’ in the closed and the open economy. [5] In the open economy case, what happens to the trade balance and to private savings net of investment following a balanced budget increase in government spending? Summarize in terms of the sector financial balances. [5]

1.3 [25]
(a) Assume that the US and euro interest rates are equal and that the uncovered interest parity condition holds. Now suppose that the US interest rate falls.
   S1: a fall in the US interest rate will lead to a depreciation of the dollar.
   S2: the US interest rate can only be below the euro interest rate when people expect the dollar to appreciate.
Are both S1 and S2 true? Explain your reasoning fully. [10]

(b) Find out what happened to the nominal interest rate set by the Federal Reserve in the US and by the ECB in the euro-zone, and to the $-euro exchange rate following September 11th 2001 (to the end of 2001) [plot the data] See links on the website for sources of data and discussion. The relevant interest rates are the Federal Funds Rate (US) and the minimum bid rate in the main refinancing operations (ECB). [5].
Is this behaviour consistent with the predictions of the UIP condition? Comment briefly on this. [10] [1 page maximum]
Problem Set 2 (to be handed in)

2.1 [25]
Use the Mundell-Fleming model and assume perfect capital mobility. There is a fall in the world interest rate.
   (a) Why might the world interest rate fall? [5]
   (b) Does this have an expansionary or contractionary impact on output in a small open economy? Does the trade balance improve or deteriorate? Explain your answer. Set out your answer for the case of fixed or flexible exchange rates (not both). If you look at flexible rates explain clearly what you are assuming about the speed of adjustment of output and exchange rate expectations. [10 for characteristics of new equilibrium; 5 for what happens to the trade balance; 5 for explanation of adjustment path.]

2.2 [25]
Use the Mundell-Fleming model and assume perfect capital mobility. Explain how a policy maker could eliminate a trade deficit and yet remain at an unchanged output level. Is this possible under a fixed and a flexible exchange rate regime? Explain why or why not. [15] Explain whether you can reconcile your answer with that to question 1.2. [5] Explain what has happened to private savings net of investment and to the budget deficit. [5]

Problem Set 3 (to be handed in)

Use the open economy model (ERU-AD-BT). Assume that home is a small open economy and assume perfect capital mobility. Assume that prices are set as a mark-up on unit costs.

3.1 [25]
Identify the consequences in the medium run of a fall in world interest rates under fixed and flexible exchange rates. [15] Compare your results with those obtained using the Mundell-Fleming model. [5] Provide a succinct interpretation of your findings. [5]

3.2 [25]
Take the case of a small open economy with a flexible exchange rate. Compare the impact and subsequent effects on real wages, inflation and unemployment of
(a) a contractionary monetary policy (assume there is a one-off cut in the money supply and that otherwise the growth rate of the money supply remains constant) and
(b) implementation of a policy to reform the labour market (you may model this as a downward shift of the WS-curve).
Show diagrams with the real wage on the vertical axis and time on the horizontal axis; inflation on the vertical and time on the horizontal. [10 for each] Concisely summarize your results [5]. [Do not hand in, but you will find it useful to work out how your results compare with those for a closed economy. You will also find it interesting to look at the empirical analysis of labour market reform and unemployment in Chapter 18, Section 2.2.]
Problem Set 4 (Do not hand in; be prepared to present your answers on the board in class. Use models to frame your answers. You will need to prepare about one page for each question.)

4.1
Identify a feature of devaluation that makes it a useful policy instrument. Illustrate with a historical (i.e. real world) example. Explain what limits its usefulness as a policy instrument.

4.2
In January 2001, the Nobel prize-winning economist Milton Friedman said that although the high inflation of the 1970s followed the decision of oil producers to cut production, similar behaviour by the oil producers now would not be followed by high inflation because “central bankers behave differently”. Provide an explanation of this statement. Does this mean that we should not be concerned about the recent oil price rises? Explain.

4.3
What is the difference between an external trade shock and an aggregate demand shock? Provide a historical (i.e. real world) example of each and clarify the difference by exploring the implications for output, the trade balance and for the policy responses that may be appropriate.

Problem Set 6 (to be handed in)

6.1 [10]
What is the connection between the concept of diminishing returns to capital and the hypothesis that poor countries grow faster than rich ones? Is this hypothesis supported in the data for a broad set of countries in the world? Comment briefly, making use of the Solow-Swan growth model.

6.2 [25]
Assume we are in a Solow-Swan world in which the population is growing at a constant rate (and there is no technological progress). Suppose from an initial steady state, there is a sudden fall in the growth rate of the population. Would you predict a rise or a fall in output growth; in the growth of output per head? Describe how and why the economy adjusts to a new steady state and how the new steady state differs from the old one.

6.3 [15]
S1: ‘A rise in savings reduces GDP.’
S2: ‘A rise in savings raises living standards but not the long run growth rate’.
Use economic models to explain the logic of these two statements. Note that you will need to explain how you interpret ‘living standards’.
LEARNING OBJECTIVES

**Topic 1. Short-run analysis of the open economy (Lectures 1-6)**

By the end of this Topic, you should be able to do the following:

1. Derive and explain alternative forms of the goods market equilibrium condition (using as appropriate words, algebra or diagrams)
2. Derive and explain determinants of the trade balance and implications for national wealth
3. Define real and nominal exchange rates; explain 2 methods of measuring the real exchange rate
4. Explain how prices are set in open economies and how this is related to the degree of segmentation of goods markets (including reference to empirical evidence)
5. Explain how the pricing hypothesis is related to measurement of the real exchange rate
6. Derive import and export functions using ‘home cost’ pricing
7. Define the terms of trade, its relationship to the real exchange rate & its economic significance
8. Explain what determines $\frac{\partial BT}{\partial \theta}$: noting the terms of trade effect and the volume effect; relate to the Marshall-Lerner condition and the J-curve
9. Derive the open economy IS curve and its properties
10. Discuss what happens to $BT$ (and why) following ISXM shocks; including to $\theta$
11. Define and explain the balance of payments identity and its components
12. Explain the meaning and relevance of the following assumptions: perfect capital mobility, small economy, perfect asset substitutability
13. Use the concept of arbitrage in international financial markets
14. Define and explain the uncovered interest parity condition and its uses
15. Use the UIP diagram to discuss a change in the home interest rate, the world interest rate, the expected exchange rate
16. Explain what is meant by a balance of payments crisis and official intervention
17. Explain the 2 polar monetary policy regimes of fixed and flexible exchange rates; compare money demand and money supply functions with closed economy equivalents; relate to the central bank’s balance sheet
18. State and explain the assumptions required for deriving the Mundell-Fleming model
19. Conduct comparative static exercises using the M-F model stating in each case the characteristics of the new equilibrium and explaining a plausible adjustment path (domestic and external shocks)
20. Discuss adjustment to a new short-run equilibrium using backward-looking exchange rate expectations and rational exchange rate expectations; explain the impact of different assumptions of the speed of adjustment in the goods market and the concept of overshooting
21. Explain why monetary policy does not work with fixed exchange rates and what instrument may substitute for it

**Topic 2. Medium-run analysis of the open economy (Lectures 7-10)**

By the end of this Topic, you should be able to do the following:

1. Explain what determines the inflation rate in a medium-run equilibrium under fixed exchange rates and under flexible exchange rates (money supply targeting, i.e. \( LM \)-type and inflation-targeting, i.e. \( MR \)-type) regimes
2. Explain why there is a range of medium-run constant inflation equilibria in the open economy
3. Use real wage / employment diagrams to discuss the short-run and medium-run equilibria following an \( IS \) shock and a plausible adjustment path to the medium-run equilibrium
4. Define and derive the \( ERU \) curve, explain how the \( WS \) and \( PS \) curves compare with their closed economy equivalents
5. Define the real consumption wage and its significance
6. Explain why the economy may be ‘off’ the \( ERU \) curve and what happens to produce adjustment to a medium-run equilibrium on it
7. Show how the goods market equilibrium condition, financial market equilibrium and the balance of trade are represented in the \( \theta y \)-diagram
8. Conduct comparative static exercises using the short- and medium-run model stating in each case the characteristics of the new equilibrium and explaining a plausible adjustment path (domestic and external shocks)
9. Define the concept of long-run equilibrium and relate it to the balance of payments identity
10. Explain why a medium-run equilibrium may not persist indefinitely and identify the forces producing adjustment

**Topic 3. Shocks and policy responses in the open economy (Lectures 11-12)**

By the end of this Topic, you should be able to do the following:

1. Analyze how fiscal, monetary / exchange rate, and supply-side policies work in the open economy (including comparison with the closed economy)
2. Analyze the causes and consequences in the short-, medium- and long-run of
   a. aggregate demand (\( IS \) and \( e \)) shocks
   b. external trade shocks
   c. supply side shocks
   d. external supply shocks
3. Relate the debate about the appropriate choice of exchange rate regime to the nature of shocks
4. Discuss the pattern of real wages over the cycle, distinguishing between different shocks and comparing with behaviour in the closed economy
5. Discuss the correlation between key variables in the model following different shocks and comparing with behaviour in the closed economy
6. Explain verbally how adjustment to an \( IS \) shock may differ if the central bank targets inflation (\( MR \) type) rather than follows a money supply growth rule (\( LM \) type)
**Topic 4. Applications of open economy analysis to policy & performance since 1990 (Lectures 13-16)**

By the end of this Topic, you should be able to do the following:
1. Explain how the models learnt in this course can be applied to analyze specific episodes of economic performance and policy.
2. Identify appropriate data series that can be used to check the predictions of the models about how economic variables move in response to shocks and changes in policy.

NB You are not expected to acquire a detailed knowledge of the various country cases analyzed in Chapter 17.

**Topic 5. Introduction to growth economics (Lectures 17-20)**

By the end of this Topic, you should be able to do the following:
1. List the stylized facts of long run growth.
2. Explain verbally the difference between a model of exogenous growth and a model of endogenous growth.
3. Define the growth rate (including the so-called dot notation) and explain how it can be calculated from data.
4. Describe the key features of the Solow-Swan growth model, including the assumptions about the nature of the production function (define the intensive production function), and describe how labour and capital move over time.
5. Define the steady state or, equivalently, the balanced growth path and explain the characteristics of the equilibrium.
6. Derive and explain Domar’s formula and the fundamental law of motion of the Solow-Swan model.
7. Explain and use three diagrams to analyze steady state and transitional dynamics (levels and growth rates):
   - basic SS diagram with $k$ on the horizontal axis and $y$ on the vertical;
   - alternative SS diagram with $k$ on the horizontal axis and growth rates on the vertical axis showing the $g_K$ and $g_Y$ curves plus the horizontal line for $n$
   - convergence diagram with $k$ on the horizontal axis and growth rates on the vertical axis showing $g_k$ as the gap between the $sf(k)/k$ curve and the horizontal $n+\delta$ horizontal line.
8. Compare and contrast the concepts of absolute (= unconditional) and conditional convergence.
9. Explain how technical progress is introduced in the Solow-Swan model, how the characteristics of the steady state are altered, and how changes in $x$ affect steady state and transitional dynamics.
11. Explain what is meant by the Golden Rule savings rate and how it is derived.