# Introduction and the Basic Model

## Applied International Economics.

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# Table of contents

# Introduction

This course focuses on the theory of international financial and trade issues, particularly in developing economies. Topics include exchange rates, capital flows, trade policies, and macroeconomic policy in an open economy. The course has the following learning objectives for the student:

- Understand the functioning of the real exchange rate, the trade balance, and international markets.
- Analyze trade openness and the implications in economic crises like sudden stop episodes.
- Learn the role of fiscal policy in open economy contexts.
- Interpret the optimal fiscal policy in an open economy.

# Know your instructor in 1 minute

# Course grading

**Table 1:** Course Grading

| Item | Grading |
|---|---|
| Problem Set 1 | 15% |
| Problem Set 2 | 15% |
| Class Attendance | 5% |
| Midterm Exam | 25% |
| Final Exam | 40% |

Source: Own elaboration.

# Syllabus

# Syllabus

Our class will be based on the following book:

- Végh, C. A. (2013). Open economy macroeconomics in developing countries. MIT press.

There are two types of readings in this course: required and optional. The class syllabus PDF (found on Brightspace or my webpage) contains the list of readings.

# Class Guidelines

# What I expect from you in this class

- You read *to the very least* the required readings.
- You participate. This is a class that will train your economic intuition, it's okay to ask questions!
- You speak in English. I want you guys to practice.
- Finally, this is not a technically hard course, but it will require you to use your economic intuition.

# How to contact me

You can contact me via Brighspace, but I prefer you send me an email to:

- gabrielmarinmu.97@gmail.com

For any urgent matter, let us create a Whatsapp group (I accept volunteers to create it).

# The Basic Model of a Small Open Economy

# In this model

## Objectives

- Households are able to smooth consumption over time
- The trade balance acts as a shock absorber

## Assumptions

- Endowment economy
- Two periods
- Single tradable good
- Perfect capital mobility - households can borrow/lend at the international capital markets with price $r$

# Budget constraints

For the two periods we have

$$b_1 = y_1 - c_1, \tag{1}$$

$$0 = (1 + r)b_1 + y_2 - c_2, \tag{2}$$

where $b_1$ denotes net foreign assets and $y_t$ is the endowment at time $t$.

Combining the budget constraints yields the intertemporal budget constraint (IBC)

$$y_1 + \frac{y_2}{1 + r} = c_1 + \frac{c_2}{1 + r} \tag{3}$$

# Budget constraints - trade balance

Let us define the trade balance in each period as:

$$TB_1 \equiv y_1 - c_1, \tag{4}$$

$$TB_2 \equiv y_2 - c_2. \tag{5}$$

Therefore, we can interpret the trade balance as the difference between exports ($y$) and imports ($c$).

Using Equation (3), it follows that

$$TB_1 + \frac{TB_2}{1+r} = 0. \tag{6}$$

Therefore, if a country runs a trade deficit in the first period ($TB_1 < 0$) it must run a trade surplus in the second period ($TB_2 > 0$).

# Budget constraint - current account

Now, the current account for each period is the following:

$$CA_1 \equiv y_1 - c_1 \tag{7}$$

$$CA_2 \equiv rb_1 + y_2 - c_2 \tag{8}$$

which we know by Equations (1) and (2) that becomes:

$$CA_1 + CA_2 = 0. \tag{9}$$

Since savings are income minus consumption, it follows that

$$CA_1 = S_1 \tag{10}$$

$$CA_2 = S_2 \tag{11}$$

Therefore, absent of investment, the current account equals the economy's savings.

# Budget constraint - the balance of payments

We can interpret Equation (1) as

$$\underbrace{y_1 - c_1}_{CA_1} \underbrace{b_1}_{-KA_1} = 0, \tag{12}$$

or

$$CA_1 + KA_1 = 0. \tag{13}$$

Equation (13) represents a simple expression for the balance of payments. This equation tells us that if an economy is running a current account deficit in the first period ($CA_1 < 0$), it must run a capital account surplus in the same period ($KA_1 > 0$) and viceversa.

$$KA \begin{cases} < 0 & \text{capital outflow} \\ > 0 & \text{capital inflow} \end{cases}$$

# Households

The households' utility function has the following form:

$$W = u(c_1) + \beta u(c_2), \tag{14}$$

where $c_t$ denotes consumption and $\beta \in (0,1)$ is the discount factor. By definition we have that $\beta \equiv 1/(1+\delta)$, with $\delta$ being the discount rate.

Households choose $c_1$ and $c_2$ to maximize Equation (14) subject to Equation (3). The Lagrangian is as follows:

$$\mathcal{L} = u(c_1) + \beta u(c_2) - \lambda \left( c_1 + \frac{c_2}{1+r} - y_1 - \frac{y_2}{1+r} \right), \tag{15}$$

where $\lambda$ is the Lagrange multiplier. The first-order conditions are:

$$u'(c_1) = \lambda, \tag{16}$$

$$\beta u'(c_2) = \frac{\lambda}{1+r}, \tag{17}$$

# Households (continued)

If we combine both budget constraints we obtain our typical Euler equation

$$u'(c_1) = \beta(1+r)u'(c_2). \tag{18}$$

Suppose we have $\beta(1+r) = 1$, it follows from this that:

$$c_1 = c_2 = \bar{c} \tag{19}$$

In this case, consumption is **fully smoothed** over time *regardless of the output path*.

# Reduced-form solutions

Let us define the present value of output as:

$$Y \equiv y_1 + \frac{y_2}{1+r}, \tag{20}$$

using our intertemporal budget constraint (3), we obtain an expression for consumption:

$$\bar{c} = \left(\frac{1+r}{2+r}\right) Y. \tag{21}$$

Now, if we define the permanent income as the level of constant output ($y^p$) that equals the present discount value of output, by definition we would obtain:

$$y^p + \frac{y^p}{1+r} \equiv Y. \tag{22}$$

which rearranging leads to

$$y^p = \left(\frac{1+r}{2+r}\right) Y = \bar{c}. \tag{23}$$

Households consume their permanent income and finance any deviations of output from $y^p$ with trade imbalances!

# Reduced-form solutions (continued)

From our trade balance equations (4) and (5) we obtain

$$TB_1 = y_1 - y^p, \tag{24}$$

$$TB_2 = y_2 - y^p. \tag{25}$$

Conversely, we can solve for the trade balance with Equation (23) as follows:

$$TB_1 = \frac{1}{1+r}(y_1 - y_2) \tag{26}$$

$$TB_2 = \frac{1+r}{2+r}(y_2 - y1) \tag{27}$$

# Example I: Stationary economy ($y_1 = y_2 = \bar{y}$)

The economy is stationary in the sense that output is constant over time. This implies that $y^p = \bar{y}$ and

$$TB_1 = 0,$$
$$TB_2 = 0.$$

In this case, the economy has no motive to borrow/lend.

# Example II: Bad times ($y_1 < y_2$)

Suppose the economy experiences ”bad times” in the first period. In this scenario, households must run a trade deficit to keep their consumption constant over time. In period 2, however, they must run a trade surplus to repay the principal plus interest.

$$TB_1 = \frac{1}{2+r}(y_1 - y_2) < 0,$$

$$TB_2 = \frac{1+r}{2+r}(y_2 - y_1) > 0.$$

Moreover, we know from Equation (1) that debt in period 1 is equal to $-b_1$. In period 2, households repay the principal plus interest $-(1+r)b_1$ since from Equation 2

$$y_2 - c_2 = -(1+r)b_1$$

# Example III: Good times ($y_1 > y_2$)

Now the economy experiences ”good times” in the first period. In this scenario, households run a trade surplus in period 1 (lend abroad). In period 2 they run a trade deficit.

$$TB_1 = \frac{1}{2+r}(y_1 - y_2) > 0,$$

$$TB_2 = \frac{1+r}{2+r}(y_2 - y_1) < 0.$$

Now, assets in period 1 are equal to $b_1$. In period 2, assets plus interest finance the households' excess consumption over output

$$c_2 - y_2 = (1+r)b_1$$

# How does this economy respond to different shocks?

Suppose we have a permanent negative shock (both $y_1$ and $y_2$ fall) in a stationary economy. How does consumption and the trade balance react?

# How does this economy respond to different shocks?

Now, only $y_1$ only falls whereas $y_2$ remains the same. How do our variables react?

# Key implications

- Households smooth consumption regardless of output path
- The trade balance acts as a shock absorber
- The trade balance and the current account are procyclical.
- A small open economy should finance temporary shocks, but adjust to permanent ones.