International Finance

Zichao Yang

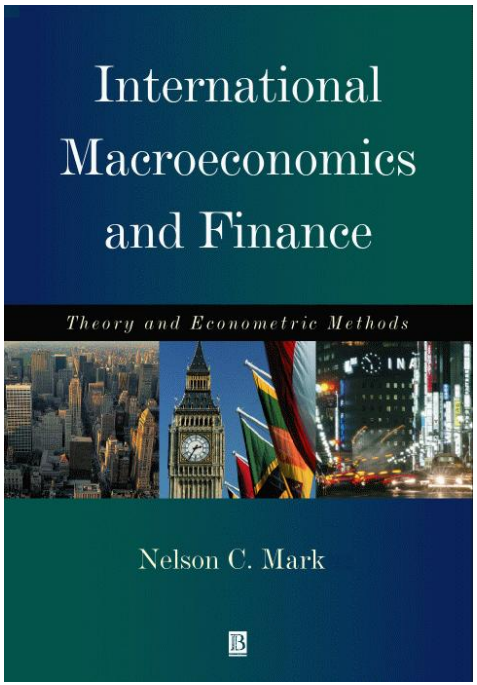
Zhongnan University of Economics & Law

Date: August 31, 2025

Textbook

International Macroeconomics and Finance: Theory and Empirical Methods by Nelson C. Mark

You can download the textbook on the author's personal website:
`https://www3.nd.edu/~nmark/book/book.html`



Grading Policy

1. Homework (30%)

You will have 2-3 HW assignments through out this course.

HW can be done in groups but each of you need to turn in your own HW.

HW deadlines are **HARD** deadlines. If you do not have a good reason (e.g. medical emergency), I will deduct 10-50 points based on how late your HW is turned in.

Grading Policy

2. Presentation (30%)

Try to form a study group (2 people per group) by the end of this week. Each group will have 90 minutes to present their replication of a paper in the last 2 weeks.

Please send me the names of your group members and the paper you choose before **September 15th**.

3. Final Report (40%)

Each group needs to turn in one report to describe the paper replication process in detail. For example, the obstacles you overcome or other issues you find in the paper you replicate. Also, please clearly state in your report each team member's contribution to this project.

Chapter Roadmap

In this chapter, our discussion covers these three topics:

- A basic description of international financial instruments and the markets
- A brief overview of the national income accounts and their relation to the balance of payments
- A discussion of the central bank's balance sheet

Foreign Exchange

European terms VS. American terms

Cross rate: a foreign currency exchange transaction between two currencies that are both valued against a third currency.

Triangular Arbitrage Condition:

$$S_1 = S_3^x S_2$$

where S_1 is the dollar price of the pound, S_2 is the dollar price of the euro, and S_3^x is the euro price of the pound.

The cross-rate market is in equilibrium if the triangular arbitrage condition is not violated.

Triangular Arbitrage Condition Violation

Suppose: $S_1 = 1.60$ dollars per pound, $S_2 = 1.10$ dollars per euro, and $S_3^x = 1.55$ euros per pound. Can we earn arbitrage profit?

Triangular Arbitrage Condition Violation

Suppose: $S_1 = 1.60$ dollars per pound, $S_2 = 1.10$ dollars per euro, and $S_3^x = 1.55$ euros per pound. Can we earn arbitrage profit?

Arbitrage strategy:

- Use 1.60 dollars to buy 1 pound
- Sell 1 pound for 1.55 euro
- Sell the euros for 1.1 dollars each

Transaction Types

There are three types of foreign exchange transactions:

- Spot Transactions: transactions that are executed immediately
- Swap Transactions: the price of both the current and future transaction is set today
- Forward Transactions: current agreements on the price, quantity, and maturity for a foreign currency

The forward foreign currency can trade at a premium (forward rate > spot rate) or at discount.

Eurocurrency, LIBOR, SHIBOR

A **Eurocurrency** is a foreign currency denominated deposit at a bank located outside the country where the currency is used as legal tender.

LIBOR: London Interbank Offer Rate is the rate at which banks are willing to lend to the most creditworthy banks participating in the London Interbank market.

SHIBOR: Shanghai Interbank Offer Rate

Covered Interest Parity

Covered Interest Parity is the condition that the nominally risk-free dollar return from the Eurodollar and the Euroeuro deposits are equal. That is

$$1 + i_t = (1 + i_t^*)\frac{F_t}{S_t}$$

where i_t is the date t interest rate on a 1-period Eurodollar deposit, i^* is the interest rate on an Euroeuro deposit rate at the same bank, S_t is the spot exchange rate (dollar per euro), and F_t is the 1-period forward exchange rate.

The logarithmic approximation of the CIP condition is:

$$i_t \approxeq i_t^* + f_t - s_t$$

where $f_t \equiv ln(F_t)$ and $s_t \equiv ln(S_t)$

Profitable condition of shorting USD

(1) if we want to short USD, then after selling 1 dollar-denominated asset, we get $1 * (1 - \tau) = (1 - \tau)$

(2) this money can buy $\frac{(1-\tau)}{S}$ units of foreign currency, but you still need to pay tx fee, so eventually you get $\frac{(1-\tau)(1-\tau_s)}{S}$

(3) you invest your foreign money at the gross rate $(1 + i^*)$, but you need to pay another tx fee, so eventually you get $\frac{(1-\tau)(1-\tau_s)(1+i^*)(1-\tau^*)}{S}$

(4) then we need to convert your foreign money back to USD, and you need to pay another tx fee, you get
$\frac{(1-\tau)(1-\tau_s)(1+i^*)(1-\tau^*)}{S} F(1-\tau_f) = (1-\tau)(1-\tau_s)(1-\tau^*)(1-\tau_f)(1+i^*)\frac{F}{S}$

Now let $\bar{C} \equiv (1-\tau)(1-\tau_s)(1-\tau^*)(1-\tau_f)$, and $f_p \equiv \frac{F-S}{S}$, then the profit of shorting USD is: $\bar{C}(1+i^*)(1+f_p)$

(5) if we do not short USD, then the return is: $1 * (1+i) = (1+i)$

Hence, if the shorting strategy is profitable, we should have:

$$\bar{C}(1+i^*)(1+f_p) > (1+i) \Rightarrow f_p > \bar{f_p} \equiv \frac{(1+i) - \bar{C}(1+i^*)}{\bar{C}(1+i^*)}$$

Can you figure out the profitable condition of longing USD?

Uncovered Interest Parity

Uncovered Interest Parity is defined as:

$$1 + i_t = (1 + i_t^*) \frac{E_t[S_{t+1}]}{S_t}$$

Under the risk-neutrality assumption, expected forward speculation profits are driven to zero, so the forward exchange rate F_t must, in equilibrium, be market participant's expected future spot exchange rate $E_t(S_{t+1})$.

Violations of uncovered interest parity are common and they present an important empirical puzzle for international economists.

Futures Contracts

The forward foreign exchange market is only accessible to institutions and large corporate customers owing to the size of the contracts involved.

The futures market is available to individuals and is a close substitute to the forward market.

FUTURES	FORWARDS
Traded on exchange	Privately negotiated
Standardized, having an exchange-specified contract unit, expiration, tick size, and notional value	Customized
No counterparty risk, since payment is guaranteed by the exchange clearing house	Credit default risk, since it is privately negotiated, and fully dependent on the counterparty for payment
Actively traded	Non-transferrable
Regulated	Not regulated

Figure 1: Differences Between Futures and Forward contracts

Source:CME Group

How a Futures Contract Works

Table 1.1: Yen futures for June 1999 delivery

				Long yen position		
Date	F_{T-k}	S_{T-k}	ΔF_{T-k}	$\Delta(F_{T-k}V_T)$	Margin	ϕ_{T-k}
6/16/98	0.7346	0.6942	0.0000	0.0	2835.0	1.0581
6/17/98	0.772	0.7263	0.0374	4675.0	7510.0	1.0628
7/17/98	0.7507	0.7163	-0.0213	-2662.5	4847.5	1.0479
8/17/98	0.7147	0.6859	-0.0360	-4500.0	347.5	1.0418
9/17/98	0.7860	0.7582	0.0713	8912.5	9260.0	1.0365
10/16/98	0.8948	0.8661	0.1088	13600.0	22860.0	1.0330
11/17/98	0.8498	0.8244	-0.0450	-5625.0	17235.0	1.0308
12/17/98	0.8815	0.8596	0.0317	3962.5	21197.5	1.0254
01/19/99	0.8976	0.8790	0.0161	2012.5	23210.0	1.0211
02/17/99	0.8524	0.8401	-0.0452	-5650.0	17560.0	1.0146
03/17/99	0.8575	0.8463	0.0051	637.5	18197.5	1.0131

Figure 2: Yen futures for June 1999 delivery

Parity Relation for Futures Prices

Suppose the ratio of the domestic to foreign gross returns on an eurocurrency deposit that matures in k days is:

$$\phi_{T-k} = \frac{1 + k\frac{i_{T-k}}{360}}{1 + k\frac{i^*_{T-k}}{360}}$$

where i_{T-k} is the Eurodollar rate at $T-k$ which matures at T, i^*_{T-k} is one-year Euroeuro. Then the parity relation for futures prices is:

$$F_{T-k} = \phi_{T-k} S_{T-k}$$

where F_{T-k} is the futures price on date $T-k$ and S_{T-k} is the corresponding spot price.

Current Account

Q: National Income

A: aggregated expenditures, $A = C + I + G$

$EX - IM$: next export

R=: Net foreign income receipts

$$Q = A + \underbrace{(EX - IM) + R}_{\text{Current Account}}$$

A country with a current account surplus is accumulating claims on the rest of the world.

The Balance of Payments

The **balance of payments** is a summary record of the transactions between the residents of a country with the rest of the world.

Balance of payments **subaccount** contains:

- Current account: records transactions involving goods, services, and unilateral transfers
- Capital account: records transactions involving real or financial assets

The combined current and capital account balance is commonly called the balance of payments.

Central Bank's Balance Sheet

The central bank's assets can be classified into two main categories:

(1) domestic credit, D

(2) net foreign assets (NFA^{cb}), including foreign currency, foreign government Treasury bills, and gold.

Unsterilized Intervention VS. Sterilized Intervention

Unsterilized intervention: central bank conducts foreign exchange operations

Sterilized intervention: the foreign exchange operations is accompanied with an open market operation to keep the money supply unchanged.

Time-series Methods Review

- ACF & PACF
- Stationality
- Unit Root
- AR, MA & ARMA
- Granger Causality
- AIC & BIC
- VAR