9 & 8 EFFICIENCY MARKET HYPOTHESIS

8.1 INTRODUCTION

Security price move randomly around positive trend line, or seem to move up and down randomly, 1) risky assets should generate positive returns in the LT, and 2) as the arrival of new information is random, so as to movements in security prices

Efficient Capital Market Hypothesis (EMH): (informational) efficient capital market, security prices fully and instantaneously reflect all available and relevant info., impossible to consistently identify mispriced, active mana. will only earn normal profits

- Uninformed want efficient → reflect true value → mkt = fair
- Informed want inefficient > use inside info. to take advantages
- Efficient capital market less restrictive than perfect capital mkt

8.2 BACKGROUND

1. Security Prices and Information: market price (P_0) is the price investors have to pay for the ownership. The maximum price that a rational investor is willing to pay (intrinsic value, IV_0)

$IV_0 = \Sigma E[CF_t]/(1+rrr)^t$

E[CF] depend on future prospect of firm, rrr depend on risk

- In efficient capital market, new information is immediately and fully reflected in prices → P_0 always equals IV_0, only new info. (Unanticipated information) could cause a shift in security price.
- EMH predicts that all available and relevant information is reflected into prices instantaneously → EMH does not imply that the market has perfect foresight, Random mispricing could occur, not systematically misprice securities

2. Costly information: info. is costly to uncover, addition profit from informed trades to at least offset the cost of uncovering new information, in order to motivate info. gathering activities. Under this setting, total risk-adjusted return (i.e., before deducting trading costs and management fees) of actively managed fund should outperform their passive benchmarks. However, net of all-in costs, returns on actively managed portfolios should be at par with their passive benchmarks

- degree of mkt. eff. differs across various mkt/ groups traded in same market, depend on how intensive are analyzed. Small firms receive less attention > less efficient

3. Implications of the EMH: price cannot be affected by change in accounting, managers cannot "time" using publicly available information, A change of financing policy that does not create additional free cash flows (such as tax savings) will not increase stock value, prices serve as guides to the allocation of assets.

4. Security Price Behavior under EMH: test EMH, hypothesize how security price should behave if the market is efficient

- Fair games: $P_{i,t+1} = E[P_{i,t+1} | \Phi_t] + u_{i,t+1}$
- Cannot observe fair game so use random walk model (RW)
- random walk: $P_{i,t+1} = \mu_i + P_{i,t} + \varepsilon_{i,t+1}$
- μ is a drift term (=expected price change)
- $\varepsilon_{i,t+1}$ is change in price due to new information
- RW implies that consecutive price change must be uncorr. Security, returns should have zero serial correlation

5. Forms of the EMH: also test 1) specific news not impounded in yet 2) could be use to make abnormal profit

- Weak: reflect all information in market trading data (past price movements and trading volumes), technical not useful
- Semi-strong: publicly info., fundamental not useful
- Strong: info. relevant to the firm, inside information not useful

6. Issues Regarding EMH Tests:

① Joint test: use equi model CAPM, APT e.g. Fama-French rejects CAPM not mkt

② Magnitude: small increase in performance (economically significant, hard to detect especially when returns fluctuated

③ Selection bias: fail invest strat. will report to public

- Survivorship bias: have to collect all even they're dead

④ Lucky event: outperform in long-run, luck or skilled?

- Data mining: strat. beat mkt in past may not good in future

8.3 WEAK FORM TESTS

1. Trading Rules: trading strategy vs buy-and-hold strategy on the same stocks, after adjusting trading costs, most technical not, many success trading are either sample or period specific

2. Returns over Short Horizon: positive corr. in ST (momentum),

- Momentum effect: good or bad recent performance of stocks continues over the short to medium terms

3. Returns over Long Horizon: negative corr. in LT (reversal),

- Reversal effect: reversal of returns on the market port in LT
- Contrarian Strategy: stocks with high returns over the past 5 year under-perform stocks with poor past return

4. Time Patterns in Security Returns: Day-of-the-week Effect, January Effect

5. Conclusion: reject RW, not reject weak → trading cost, risk

8.4 SEMI-STRONG FORM TESTS

1. Returns and Firm Characteristics:

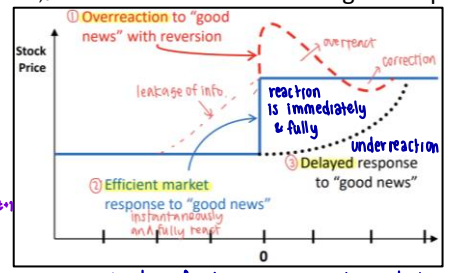
- P/E: low P/E (value) outperform high P/E (growth) portfolios
- Size: small firms have higher returns than large-firm portfolios
- BTM: high BTM (value) outperform low BTM (growth)
- Interpret of mkt anomalies: Markets are efficient, but systematic risks not captured by the CAPM beta

2. Event Study and Announcement Effects: steps

1) identify types of announcements e.g. earnings, takeover, etc.
2) collect firms making the same announcement: announce date, Price surrounding the date
3) Each stock, rearrange data from calendar to event date

$$\text{Market model: } r_{i,t} = a_i + b_i \cdot r_{M,t} + e_{i,t}$$

- a_i = normal period abnormal return
- $e_{i,t}$ = abnormal return resulting from specific event



4) Determine market reaction,

$AR_{i,t} = r_{i,t} - (a_i + b_i x r_{M,t})$

5) Take average abnormal return across stocks, sum to get CAR

$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$

$CAR_T = \sum_{t=1}^{T} \overline{AR}_t$

8.5 STRONG FORM TESTS

1. Analyst Forecast and Fund Performance: normal analyst > true IV (price change permanent), famous > pressure on price
2. Inside Trading: no evidence of abnormal return

8.6 BEHAVIORAL FINANCE

1. The Behavioral Critique: not always rational, not make systematic forecast error

- reject EMH: 1) info. not reflect price > find abnormal profit 2) no abnormal profit > persistently make profit

① Information Processing (rational expectation): limited attention, forecast error, overconfidence, conservatism, representativeness

② Behavioral bias (rational behavior): mental accounting, regret avoidance, prospect theory

- Limits to arbitrage: fundamental risk, implementation costs, model risk

10 INTERNATIONAL MONETARY SYSTEM

9.1 EXCHANGE RATE SYSTEMS

1. An Exchange Rate: targeting exchange rate (fixed exchange rate) > monetary (managed float) > inflation

- affect firms' value through 1) value of outstanding and price competitiveness in international market

Factors	Development	Affects on Exchange Rate
Trade balance	$(X-M)_{TH} > 0$	$S^{B/S}$ ↓ (THB appreciates)
	$(X-M)_{TH} < 0$	$S^{B/S}$ ↑ (THB appreciates)
Capital flows balance	$(C.I.-C.O.)_{TH} > 0$	$S^{B/S}$ ↓ (THB appreciates)
	$(C.I.-C.O.)_{TH} < 0$	$S^{B/S}$ ↑ (THB depreciates)
Inflations	$\pi_{TH} > \pi_{US}$	$S^{B/S}$ ↑ (THB depreciates)
	$\pi_{TH} < \pi_{US}$	$S^{B/S}$ ↓ (THB appreciates)
Interest rates	i_{TH}↑	$S^{B/S}$ ↓ (THB appreciates)
	i_{TH}↓	$S^{B/S}$ ↑ (THB depreciates)
GDP growth	GDP_{TH} Boom	$S^{B/S}$ ↓ (THB appreciates)
	GDP_{TH} Bust	$S^{B/S}$ ↑ (THB depreciates)
Political Stability	Stable	$S^{B/S}$ ↓ (THB appreciates)
	Unstable	$S^{B/S}$ ↑ (THB depreciates)
BOT intervention	↑ Foreign reserve	$S^{B/S}$ ↑ (THB depreciates)
	↓ Foreign reserve	$S^{B/S}$ ↓ (THB appreciates)

2. Exchange Rate Systems:

1. Freely float: force of demand and supply, flexible in using monetary policies,
2. Fixed rate: use monetary policy for currency but give up GDP, stand ready to buy/sell FC/HC, de/revaluation, capital control and trade control
- Strengthen HC: sell FC reserve, HC money supply↓, interest on HC↑ and deflation in HC
- Weakening HC: buy FC reserve, HC money supply↑, interest on HC↓ and inflation in HC
- unsterilized intervention: buy/sell HC/FC for ST
- *FX intervention + OMO = Sterilized intervention*
3. Managed/Dirty float: CB will intervene when excess volatility occurs out of the target range

3. The Trinity of Impossibility: Attributes "Ideal Currency"

i) Exchange rate stability: boost trade and investment
ii) High level of capital mobility: cap. move in/out freely
iii) Independence of domestic monetary policy:

- gold > i, ii, gold exchange > i, iii, free float ii, iii

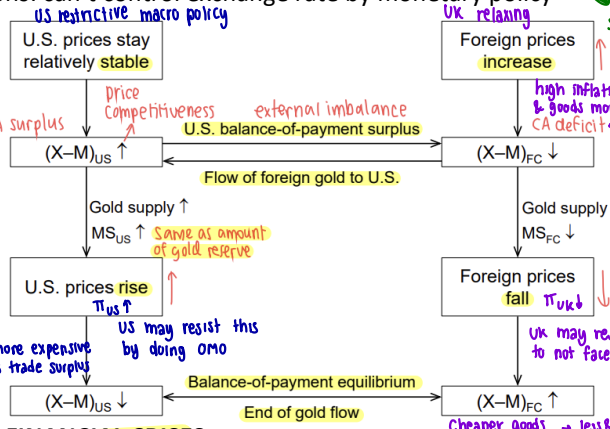
9.2 HISTORY OF INTERNATIONAL MONETARY SYSTEM

1. Gold Standard: announced the par value "gold parity",
2. Gold Exchange Standard: Bretton Woods, US declared the gold parity of USD. Other countries declared parities of their currencies in terms of either gold or USD
3. Post-Bretton Woods Systems: FX system is a hybrid

1992, Currency Crisis (from West & East Germany reunified, Berlin wall) → high economic activities → high π^{GEM} ← GER ↑ ; GER but UK not afford to ↑ ; UK → both intervene by buy & sell DM reserve with fixed EX rate → arbitrage occur (borrow £ and invest GEM) short sell & fixed ; UK fight this too → reserve ↓!! → UK drop from system

4. The European Monetary System and the Euro: exchange-rate mechanism [ERM] requires member to determine central exchange rate for its currency, in currency units per European Currency Unit [ECU] (weighted by GDP, Germany highest) DEM
- pros: cheaper transaction cost, currency risk, transparent
- cons: can't control exchange rate by monetary policy

②



9.3 FINANCIAL CRISES

1. Emerging Markets Financial Crises: foreign currency debt more than ability to repay (Chronic current account (CA) deficit + national budget deficit)
- Contributing factors: fixed/pegged exchange rate system that overvalued the local currency, fc debt (public and private debt)
- Consequences: huge net cap outflows, attacks local currencies, value of domestic assets was wiped out, severe GDP contract

BOT did not have enough RA, investors lose confidence in THB

2. Sub-Prime Crisis: With dot.com bubble, capital began to flow increasingly toward the real estate sectors in the United States
- Prime: best credit worthiness, subprime: worst credit

lend a lot to subprime

3. Europe's Debt Crisis: Greece can't use monetary, fiscal only (public debt in foreign currency, double deficit (budget & trade)) & Chronic trade deficit problem

Fed increased r^{US} too quickly (Cheap too low earlier)

11 BALANCE OF PAYMENT

10.1 INTRODUCTION

banks securitize debt to MBS → combined to CDO ; CDS insurance against default

BOP is an accounting statement summarizes all economic transactions between 1) residents of the home country 2) residents of all other countries over particular period

10.2 BOP ACCOUNTING PRINCIPLES

1. Components of BOP:

CURRENT ACCOUNT (CA): monetary value of international flows
- Goods and services balance: merchandize and service trade
- Income balance (Primary Income): investment, employment (+ int & div income / - int exp & div)
- Unilateral transfers (Secondary Income): money gift, (ex-pat, ส่งเงินกลับบ้าน, เงินส่งกลับ US: remit)

CAPITAL AND FINANCIAL ACCOUNT (KA): inter. buy/sell assets (ถ้าบ้านไม่ ส่ง ไม่ต้องปันผล)
- Capital transactions: capital transfers (debt forgiveness, migrants' goods and financial assets) and the acquisition and disposal of nonfinancial assets (rights to natural resources, patents, copyrights, trademarks, franchises and lease)
- Financial transactions: (greenfield / brown field & prefer ① > ② less instability & get techno)
  1) Direct investment: acquisitions (ownership ≥ 10%)
  2) Portfolio investment: fin. securities (bonds, stocks)
  3) Financial derivatives: derivatives (forwards, futures)
  4) Other investments: lending/borrowing in banking (+ เงินเข้ามาก ; - ส่ง principal)

(+) cap in lose claim
(−) cap out gain claim

CHANGES IN FOREIGN RESERVE (FA): held by CB, fc, gold, special drawing rights (SDR), deposit at IMF

(−) no more reserve asset

- Reasons for holding: liquidity purposes, intervention purpose

2. Recording Transactions on BOP: Double-entry bookkeeping > each transaction is recorded twice, credit (+) and debit (-)

BOP bottom line; CA + FA + RA ≡ 0

Overall balance; CA + FA

- Credit (+): receipt of pmt, export, cap inflow, ↑foreign claims on domestic asset, ↓domestic claims on foreign asset, ↓RA
- Debit (-): payment, import, cap outflow, ↓foreign claims on domestic asset, ↑domestic claims on foreign asset, ↑RA

(GDP: budget deficit < 3% ; gross public debt < 60% ; high degree of price stability) all criteria (มากกว่า) → Next, set up ECB same monetary policy

US Bank		TH Bank
▪ Cash $2 mio	▪ Deposit by US firm $1 mio	▪ Deposit with US bank $1 mio
	▪ Deposit by TH bank $1 mio	▪ Deposit by TH firm $1 mio ↳ cheque

1) US firm ฝากกับ US bank
2) US firm จ่ายให้กับ TH firm

change only claim ; change money owner ; same account

TH bank has more claim on US asset ⊖ FA

Thai bank has more claims over US assets

EX: TH sells rice to US, US pay in check at US bank
- CA (export) + FA (other inv) − deposit TH ฝากกับ bank US

TH gives credit

10.3 INTERNATIONAL ECONOMICS LINKAGES

1. BOP and Exchange Rates:

FIXED RATE, overall balance CA+FA ≠ 0, CB intervene by RA
- If CA + FA > 0, CB buy fc, ↑ foreign reserve (RA < 0) — HC stronger
- If CA + FA < 0, CB sell fc, ↓ foreign reserve (RA > 0) — HC weaker

sell HC → increase HC money supply → ↑ inflation → CB use OMO to sell bonds → bond price ↓, yield ↑ — don't have to intervene

FLOATING RATE, CA≠FA, auto eliminate by ex rate, not RA
- If CA + FA > 0, HC appreciate, auto reduce overall balance (X−M)↓, (CI−CO)↓ → back to 0
- If CA + FA < 0, HC depreciate, auto reduce deficit CA+FA (X−M)↑, (CI−CO)↑

FA + RA measures net inflows of capital (NIC)
- If FA + RA > 0, foreigners claims on domestic assets increase (increase in foreign debt)
- If CA < 0, FA + RA > 0, ↑ the nation's foreign indebtedness
- If CA > 0, FA + RA < 0, ↓ foreign indebtedness (nation' foreign debts↓)

2. CA Deficit and Foreign Indebtedness: foreign claim > domestic claim, FA + RA > 0, CA < 0 — cap in: accumulate external debt

* CA deficit → chronic → crisis or strong economy

3. Is CA Deficit a Bad Thing to Have?: Chronic CA deficit > bad, Well spent = good > not bad (some countries bad)

i_M ↑ income → FA > 0 → THB appre → CA < 0

ใช้ GDP สร้าง → FA > 0 → import ↑ → CA < 0

4. CA and Aggregate Saving and Investment:

[1] Aggregate Expenditure: Y = C + I + G + (X − M) (national spending)

[2] National Income (NI): Y = C + T + S

X − M = (S − I) + (T − G) = NI - NS (national)

= Net Private Savings + Budget Surplus

= Overall Savings-Investment Balance

- NI high(low) - NS low(high) = CA -deficit(+suplus)

- If no (T−G) & inv demand > saving → import capital → CA deficit ↑
- If gov's (T−G) can cause CA deficit
- CA deficit solved by ① encourage household to save more ② gov ↑T or ↓G

5. Possible Solutions to Chronic CA Deficits:

Chronic CA deficit could potentially create problems. * but! J-curve effect
- Possible approaches: exchange rate policy (devaluation), trade policy, improve economic fundamentals (raise national product)

12 INTERNATIONAL PARITY CONDITIONS

11.1 INTRODUCTION

1. The Law of One Price (LOP): In free markets, arbitrage activities will ensure that prices of identical assets, when converted into a common currency, are equal across markets.

Price discrepancies may only stay within transaction costs

No Arbitrage Condition;
- w/o: $P_{FC}^{B} - P_{HC}^{B} = 0$
- w/: $P_{FC}^{B} - P_{HC}^{B} \le$ transaction cost

P_{FC} is relatively too high. Arbitrage drive P_{HC}^{B} ↑, P_{FC}^{B} ↓, $S^{B/\$}$ ↓

EX sell rice ฿5K, $150, $S^{B/\$}$ = ฿40/$
- THB price of US rice = 150 × 40 = ฿6K → If no arbitrage = ฿5K
- Diff = ฿1K : price of US rice too high → P_{TH} ฿ ↑, P_{US} $ ↓, $S^{B/\$}$ ↓ (buy TH rice, sell to US @ ฿40/$) → ฿ appre, $ depre, arbitrage profit

2. International Parity Conditions: PPP, IFE, IRP equilibrium conditions assume free markets

11.2 PURCHASING POWER PARITY (PPP)

* real int rate : nominal rate − π^e

Observe HC & FC's CPI ← หมด: basket → เท่ากันไม่ได้

1. Absolute Purchasing Parity: price levels of G&Ss between two countries must be equal when expressed in a common currency

$P_{H,t} = P_{F,t} \times S_t^{HC/FC} \rightarrow S_t^{HC/FC} = P_{H,t} / P_{F,t}$

If PPP ≠ is mkt. exchange rate → incorrect/mkt not in equilibrium

Absolute PPP fails in empirical tests > The compositions of CPIs are different, not all items in CPI are tradable internationally, LOP not applicable to non-tradable G&Ss, effect of mkt frictions

2. Relative Purchasing Parity: the relative value between two currencies (exchange rate) will adjust to reflect changes in relative price levels (inflationary). at any point in time absolute PPP may not hold. However, the movement of relative price and spot rate should be toward direction of absolute PPP

$$P_t / P_0 = (1 + \pi_F)^t$$

$$E[S_t^{HC/FC}] / S_0^{HC/FC} = (1 + \pi_H)^t / (1 + \pi_F)^t$$

(S_0 current spot rate ; if RHS ≠ 1, LHS ≠ 1, there is change ; if $\pi_H > \pi_F$, HC should depreciate against FC)

$$1 + c = 1 + \text{inflation differential}$$

If t=1, $(S_1^{HC/FC} - S_0^{HC/FC}) / S_0^{HC/FC} \approx \pi_H - \pi_F$

3. The Logic Underlying Relative PPP: Once the inflations take effect, US get price competitiveness over TH at S = $S_0^{B/\$}$. This is because US G&Ss will be 8.90% relatively cheaper ↓demand TH, ↑demand US, $S_0^{B/\$}$↑. Once $ appreciates against THB by the same proportion as the change in relative price level, the price advantage of US G&S's will be fully eliminated. Then, the FX and the product markets will be back in equilibrium

4. Real Exchange Rate: affected by: (1) domestic inflation (2) foreign inflation and (3) exchange rate

$S_t^* = S_t^{HC/FC} \times [P_{F,t} / P_{H,t}]$ (real exchange rate ; $P^{\$}_{US}$)

FC is too strong in real term, too expensive → USD should depreciate

reflects how much a unit of foreign goods is worth in terms of home goods. If > 1, This means the $ real exchange rate is too high causing US products to lose price competitiveness. In equilibrium, we should expect the nominal exchange rate of the $ to go down reducing its real exchange rate to 1

$S^* < S_0$ → HC too weak ; $S^* > S_0$ → too strong

Absolute PPP: $S_t^* = S_t^{HC/FC} \times [P_{F,t} / P_{H,t}]$

Relative PPP: $S_t^* = S_t^{HC/FC} \times \{(1 + \pi_F)^t / (1 + \pi_H)^t\}$ → real rate will not change over time in PPP

S_t^* is the real exchange rate of FC measured against HC at time t relative to time 0 (Note that S_t^* is unitless)

5. Empirical Evidence: Exchange rates are more volatile than corresponding national price levels, Empirically, PPP holds better in the long-run than in the short-run, The currencies of countries that had very high inflation rates relative to trading partners experienced rapid depreciation

In theory, country with high π will depre against USD

forecast error tends to become smaller overtime (in S_t, mkt overshoot) — PPP hold in long run

11.4 INTERNATIONAL FISHER EFFECT (IFE)

1. International Fisher Effect: or Uncovered Interest Parity (UIP) two investments of identical risk should provide the same expected nominal r in a common currency

Ex rate risk

$$E[S_t^{HC/FC}] / S_0^{HC/FC} = (1 + i_H)^t / (1 + i_F)^t$$

$$1 + c = 1 + \text{interest differential}$$

If t=1, $(E[S_1^{HC/FC}] - S_0^{HC/FC}) / S_0^{HC/FC} \approx i_H - i_F$

If $(1 + i_{TH}) > (E[S_1] / S_0) / (1 + i_{US})$, funds will flow out of US into TH causing i_{TH}↓, i_{US}↑ and $S_0^{B/\$}$↓. This continues until IFE holds

if H has high i_H → cancel ; mkt expects HC to depreciate over time

Transactions	t_0	t_1
Ⓐ THB or HC Investment		
1. Inv B @ i_{TH} pa.	−B1	+B1×(1+i_{TH}) (investment OUTcome from THB account)
Ⓑ USD or FC Investment		
1. Convert B to $ @ $S_0^{B/\$}$	−B 1 (sell THB to buy USD)	
	+$ 1/$S_0^{B/\$}$ (put in bank account)	
2. Inv. $ @ i_{US} pa.	−$ 1/$S_0^{B/\$}$	+$ (1/$S_0^{B/\$}$)(1+$i_{US}$) (principal + int)
3. Expect to sell $ @ E[$S_t^{B/\$}$] at t_1 (exchange rate vs. future)		−$ (1/$S_0^{B/\$}$)(1+$i_{US}$) (sell back to THB)
		+B (1/$S_0^{B/\$}$)(1+$i_{US}$)E[$S_t^{B/\$}$]
	−B1	+B1×(E[$S_t^{B/\$}$]/$S_0^{B/\$}$)(1+$i_{US}$)

in Equilibrium, must be equal

EX THB-deposit i_{TH} = 5% pa, USD-deposit i_{US} = 8% pa, S_0 = ฿30/$

THB inv : ฿1 × (1+0.05) = ฿1.05 ← not equilibrium

US inv : $(1/30) × (1+0.08) × 30 = ฿1.08

2.The Logic Underlying the IFE: The difference in nominal returns between two countries should exactly compensates investors for expected changes in the value of the currency of their investment. Higher nominal return is required from currency whose value is expected to depreciate

3. Empirical Evidence: IFE does not hold very well in the short-run, an increase in i_{US} could come either from (1) an increase in r_{US} and/or (2) an increase in $E[\pi_{US}]$. Over an extended period, high interest rates currencies tend to depreciate, while low interest rates currency tend to appreciate

4. Applications of IFE:

Carry Trade: Borrow from a currency whose interest rate is low and invest in a currency whose interest rate is higher

11.5 INTEREST RATE PARITY (IRP)

1. Interest Rate Parity: The expected nominal return on a Hedged foreign investment should be equal to the expected nominal return on domestic investment of identical risk

$$F_0^{HC/FC} / S_0^{HC/FC} = (1 + i_H)^t / (1 + i_F)^t$$

If t=1, $(F_0^{HC/FC} - S_0^{HC/FC}) / S_0^{HC/FC} \approx i_H - i_F$

- When F_0 > (<) S_0, we say that the forward rate is at a premium (discount) relative to the spot rate
- If $(1+ i_{TH}) > (F_0/S_0)*(1+ i_{US})$, funds will flow out of US into TH causing i_{TH}↓, i_{US}↑, $S_0^{฿/\$}$↓, and F_0↑, continues until IRP holds
- When LHS < RHS (US-HC/UK-FC), i_{US} is relatively too high compared to i_{UK}. To undertake arbitrage, one will borrow £ and invest the proceed in $-denominated deposit. Arbitrage drive i_{US}↓, i_{UK}↑, $S_0^{\$/£}$↓, $F_0^{\$/£}$↑ until IRP holds

Transactions	Cash flows t_0	Cash flows t_1
1. Borrow £1 @ i_{UK}=11.56%	+£ 1	–£ 1(1+0.1156)
2. Sell £ for $ at S_0=$1.25/£	–£ 1	
	+$ 1×1.25	
3. Invest $ @ i_{US}=8.15%	–$ 1.25	+$ 1.25(1+0.0815)
4. Buy £ & Sell $ Forward @ F_0=$1.20/£		–$ 1.25(1+0.0815)
		+£ 1.25(1+0.0815)/1.20
	–฿0	+£ 0.010963

2. The Logic Underlying IRP: The forward premium/discount in exchange rate is determined by the nominal return differential between the two currencies. A currency with lower interest rates is traded at forward premium relative to a currency with higher interest rates

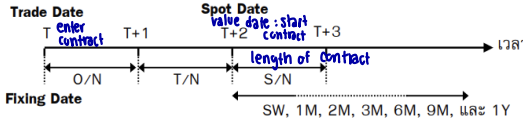
3. Empirical Evidence: IRP condition, the forward rate normally moves within its transaction cost bands. Arbitrage opportunities were rare. For longer-date forwards (cross currency and interest swap), no-arbitrage bands wider and arbitrage opportunities were more often. IRP may fail to hold because, arbitragers may be uncertain whether they can conduct transactions at the posted prices. Forward position involves default risk

13-14 MONEY MARKETS AND FOREIGN EXCHANGE MARKETS

13.1 INTRODUCTION TO MONEY MARKETS (MM)

1. What is MM?: short-term debt instruments are traded, commercial, banks as FX-dealers. The motivation is to earn non-interest income (NII), which is bid-ask spread in this case
- Interest rate (IR) products: (interbank lend/borrow, Repos, short-term debt securities, IR Derivatives(FRA, IRS and CCS)
- Foreign exchange (FX) products: (FX Spot, Derivatives)

2. Value Dates:
- *"Deal/Trade date"*: transaction is agreed
- *"Value date"*: transaction will be settled
- a *"normal transaction"* settled in 2 business days, spot transaction, where the settlement date is called *"spot date"*
- *"Forward transactions"*: agreed today but for which settlement will be on a later date than normal (after spot date)



		Start after T	Ending on day
O/N	Overnight	T	T+1
T/N	Tom/Next	T+1	T+1
S/N	Spot/Next	T+2	T+3
S/W	Spot-week	T+2	1 week later
1W	1 month	T+2	1 month later
6M	6 months	T+2	6 months later

3. Methods to Calculate Interest: THB, ACT/365, USD, ACT/360

$$I = PV * r * D/B$$
$$FV = PV + I = PV*(1 + r * D/B)$$
$$PV = FV * (1 – (d * D/B))$$
$$r = (FV/PV - 1) * B/D$$
$$r_E = (1 + r * D/B)^{(B/D)} – 1$$
$$FV = PV * (1 + r_N/N)^{N}$$
$$r_M = [(1+r_N/N)^{(N/M)} - 1] * M$$

- I = amount of interest
- FV = total proceed at maturity (future value)
- PV = capital or principal (present value)
- r = interest rate in decimal pa (i.e., 4% = 0.04)
- D = number of days of the term of interest
- B = day basis for calculation (360 or 365)

- r_E = effective annual yieldor EAR
- r_N = interest rate pa.
- N = B/D number of times per year paid (quarterly, 4)

MRR → ref rate for housing
MLR → ref rate for good credit term (retail mkt)
interbank rate (BIBOR → THOR | LIBOR → SOFR) (THBFIX)
no collateral — repo mkt with collateral

CH 14 : Foreign exchange market || Fx transactions : 1) FX spot 2) FX forward 3) FX swap ≠ int rate ≠ currency swap

13.2 FOREIGN EXCHANGE MARKETS (OTC with FX dealers)

1. What is Foreign Exchange Market?:
- 3 main type of FX instruments : FX swaps, Spot, outright forwards
- USD is most currency traded
- UK (London) is the most active market (highest transaction) — it is center for international offshore mkt
- Interbank mkt is most active
- BND fixed based on SGD

▶ Type of FX transaction :
① Spot transaction : trade for immediate delivery (settlement T+2 business day) bcs 2 currencies
* Earlier deliveries (Settle T (same day) or T+1 (TOM)) slightly different rates
② Forward transactions e.g. 3 mo forward is settle 3 months after spot (T+2 + 3 months)
③ FX swap : two legs transaction (settle contract 2 times)

Ex : 1st transaction at spot (T+2) — KBANK buy $1 mm & pay $1 × ฿37/$ = ฿37 mm (spot rate) — 3 months → Forward − $1 mm + ฿38 mm (forward rate) — KBANK make profit of ฿1 mm (counterparty loss) ⇓ there's forward premium: $i_{฿} > i_{\$}$

▶ Quotations : (just separate)
USD / THB = 34.65 (base currency / commodity; term currency / unit of acct)

- For non-bank in domestic mkt: (commodity)
  1) Direct quote : HC price of 1 unit FC
  2) Indirect quote : FC price of 1 HC
  ↳ Great Britain, Austtalia, New Zealand, Eurozone
- For inter-bank USD trades
  ① American terms : USD price of 1 FC e.g. for EUR : $1.2156/€ (USD equivalent)
  ② European term : FC price of 1 USD e.g. for EUR : €0.8227/$ per USD
  ↳ EUR, GBP, AUD, NZD

▶ Bid-ask spread : (dealer, มาก่อน, มาทีหลัง; mkt maker)
USD/THB = 30.04 / 30.10 → ระดับกันก่อน THB/USD = 1/30.1 / 1/30.04 → THB/USD = 0.02883/0.02886
bid (ราคาที่ exporter sell USD) — ASK (ราคาที่ importer buy USD) — mkt user
USD/THB = 33.46 - 55 → 33.46/33.55
If wants to sell ฿40 mm = buy USD; ได้ USD = ฿40m / 33.55/$ (gives less USD)

▶ How FX dealers obtain quotation for retail customers:
① Determine midrate
- current midrate in inter-bank mkt
- bank's position on currency
- bank's view on future ex rate

1st midpoint = B33.63/$ (B33.55/$ – B33.61/$)
↳ when mkt will close soon & a lot USD ↳ price down
ask rate (importer ซื้อ) — wider than interbank mkt — bid rate (exporter ขาย)

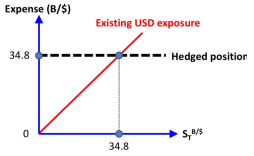
② Add bid-ask spread
- start from bid-ask spread in interbank
- liquidity risk, exchange rate risk (mkt volatility ↑ spread ↑), counterparty risk (customer's spread (default risk)) เพราะ: settlement วัน T+2 ↑

▶ Forward rate quotation : $F_0 = S_0 + \text{Swap point}$ (>0 premium, <0 discount)
▶ Uses of FX forward (bank's customers) ↑ Just adjust this to get forward rate

IMPORTER
Ex : Jan 1st import goods from US and need to make payment of $1m in 3 months (กลัว USD appreciate)
Given spot rate: USD/THB 34.00/34.25 ; 3-month swap point 0.50/0.55] Forward = 34.80 (3-mo) — risk to buy this
* opportunity cost of hedging : if USD depreciate → importer will not get benefit from hedging

FX Forward for Importers (opportunity cost of hedging: if USD depreciate → importer will not get benefit ↳ option is better)

	Transaction	Cash Flows 3 Jan	Cash Flows 3 April
1 Jan	Import a truck		–$1
1 Jan	Buy USD 3 month forward at B34.80/$		+$1
			–B34.8
			–B34.8 million



- *"Mid point"* is quoted bid-ask
- *"Square position"* is when bank clear daily transaction to 0

EXPORTER :

Ex on Jan 1st, export goods to US and will receive $1mm in 3 months

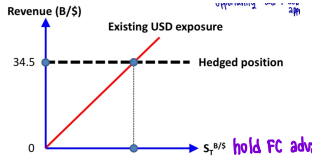
Given spot rate: USD/THB 34.00/34.25 (exporter must sell at bid rate)

3-month swap point 0.50/0.55 → Forward bid rate : 34.5

* Opportunity cost: USD might appreciate

FX Forward for Exporters

Transaction		Cash Flows 3 Jan	Cash Flows 3 April
1 Jan	Export rice		+$1
1 Jan	Sell USD 3 month forward at B34.50/$		−$1
			+B34.5
			+B34.5 million



▶ IRP condition : forward ex rate calculated from IRP

$$F_0^{HC/FC} = S_0^{HC/FC} \times \frac{\left(1 + r_{HC} \times \frac{T}{B_{HC}}\right)}{\left(1 + r_{FC} \times \frac{T}{B_{FC}}\right)}$$

term – TC/BC – base; int 90 วัน (3 เดือน); int 365

if $r_{HC} > r_{FC} \rightarrow F^{HC/FC} > S^{HC/FC}$ (compensate forward premium)

if $r_{HC} < r_{FC} \rightarrow F^{HC/FC} < S^{HC/FC}$ (hold FC advantage)

$$* \text{ swap point}_0 = S_0^{HC/FC} \times \left[\frac{i_{HC} \times \frac{T}{B_{HC}} - i_{FC} \times \frac{T}{B_{FC}}}{1 + i_{FC} \times \frac{T}{B_{FC}}}\right]$$

$$\approx S_0^{HC/FC} \times \left(i_{HC} \times \frac{T}{B_{HC}} - i_{FC} \frac{T}{B_{FC}}\right)$$

BoT & commercial bank shall not do FX derivative to speculate (only hedge) ↳ trade document to support

EX : 2 sided price can be constructed for USD/THB 6-mo forward rates.

6-mo period : 183 days

Given USD/THB spot : 34.250 – 280

THB 6-mo int rate : 4.10 / 4.20%

USD 6-mo int rate : 3.30 / 3.40%

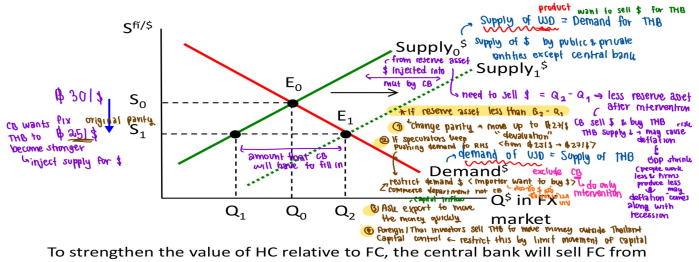
$$F_{BID} = 34.25 \times \left(\frac{1 + 0.041\left(\frac{183}{365}\right)}{1 + 0.034\left(\frac{183}{365}\right)}\right)$$

$$F_{ASK} = 34.28 \times \left(\frac{1 + 0.042\left(\frac{183}{365}\right)}{1 + 0.033\left(\frac{183}{365}\right)}\right)$$

FX market → trade 1 currency for another currency

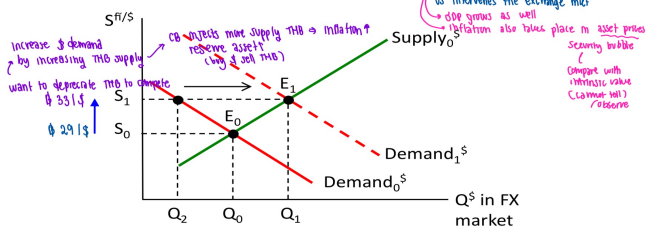
home currency → ฿

Market Intervention: Strengthen the Value of HC



To strengthen the value of HC relative to FC, the central bank will sell FC from its reserve (equal to $Q_2 – Q_1$). To make the fixed rate credible, the central bank must have sufficient reserve.

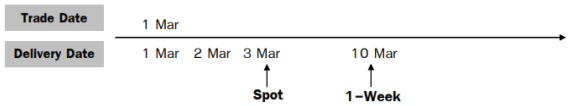
Market Intervention: Weaken the Value of HC



Ex: A bank quotes the following rates

USD/THB spot:	32.550/600		
O/N swap:	0.010/0.012 →	Today:	32.524/578
T/N swap:	0.012/0.014 →	Tomorrow:	32.536/588
S/W swap:	0.040/0.046 →	1-week forward:	32.590/646

3. FX Swap: borrowing in one currency using another currency as collateral in full value, FX swap transaction is named in accordance with the value dates in the first and second leg (Spot/Forward, Forward/Forward, other short date)



5. Bank Risk: In providing dealing services in FX market

- *"Operating"*: exposure to damages and financial lost due to inadequate or failed procedures, systems or policies (human error)

ex. > miss-record of a transaction, Customer dissatisfaction (customer's regret, misunderstanding of a clearing process) solve > improving the bank's internal & external processes, knowledge and creating awareness among banks' staff

- *"Compliance"*: legal penalties, financial forfeiture and material loss an organization faces when it fails to act in accordance with industry laws & regulations, internal policies or best practices

ex. > Breaching fx regulations, failing to control credit line solve > improving the bank's internal & external processes, knowledge and creating awareness among banks' staff

- *"Price"*: possible losses from future movement of market price (i.e., exchange rate) from existing transactions that create obligations to buy or sell assets in the futures (square position everyday with another bank)

ex. > buy forward position creates possible loss if appre/depre solve > widening bid-asksprepadandsquaringt-xpositionslsays.IN a daily basis / more often -1 less price risk

- *"Counterparty/credit"*: possible losses from future movement of market price (i.e., exchange rate) from existing transactions that create obligations to buy or sell assets in the futures (credit line of credit)

ex. > **Pre-settlement risk**, possible loss if the exporter defaults on the delivery date, **Settlement risk**, On delivery date, The exporter may default after receiving THB from the bank solve > assigning credit line to the bank's customers

SUMMARY

- According to EMH, not true > stock price always at fair value, beating the mkt is impossible, overvalued stock not exist
- EMH > investment should earn normal r compensate with risk
- Semi > P/E effect
- Semi > historical stock price info and current public, not insider
- EMH believe > invest in index fund, passive investment strat
- Reversal > buy (sell) stock that perform poor (well) last period
- Technical ana focus on past price than det of future profit
- Debate mkt efficient > lucky, magnitude
- Stock price, RW > price changes are random
- Basu, low P/E > higher average return than high P/E
- Mkt decline when no significant econ event > not consistent with EMH because not a clear response to macro news
- On avg, LT, irrational > False, price gen return compen for risk
- Negative surprise, negative AR on day announced
- Efficient mkt, corr of 2-non overlap > negative and small
- Weather bad, in EMH, stock drop immediately
- B = 1.2, rM 13%, rf = 5%, rMtt = 17%, good news yesterday
- Fundamental ana > earning, dividend, E[future i]
- Eff mkt > invest in mutual fund
- Mkt anomaly > price behave differ from EMH predicted
- IFE, the spot rate that make the 2 loans to have equivalent cost in JPY term is E[S1] > if firm expect future spot > (<) E[S1], HC (FC) loan provide lower expected cost of fund
- If TH-inflation is higher than US-inflation, for THB real exchange rate to be, THB should depreciate against USD in nominal term (nominal exchange rate), As the nominal exchange rate is kept constant, the inflations imply that THB will

Thailand Balance of Payments 2018-21 (USD mio)

3 main accounts
⊕ gain Foreign currency
⊖ loss

		2018	2019	2020 p	2021 p
(1)	Current Account (CA)	28,423	38,044	21,178	-11,018
2	A. Goods and services	44,922	51,047	26,564	132
3	1. Goods	22,388	26,725	40,856	39,885
4	Exports (f.o.b.)	251,108	242,701	226,984	270,564
5	Imports (f.o.b.)	−228,720	−215,976	−186,128	−230,679
6	2. Services	22,535	24,323	-14,292	-39,753
7	Services receipts	77,474	81,178	30,989	24,502
8	Services payments	− 54,939	− 56,855	− 45,281	− 64,255
9	B. Primary income	-24,515	-20,186	-11,440	-18,588
10	Primary Income receipts	8,730	11,117	12,323	13,439
11	Primary Income payments	−33,244	−31,303	− 23,763	−32,027
12	C. Secondary income	8,015	7,182	6,055	7,438
(13)	Capital and Financial Account (FA)	-13,814	-15,717	-11,948	-2,126
14	A. Capital account	-611	4	43	0
15	B. Financial account	-13,204	-15,721	-11,991	-2,126
16	1. Direct investment	-4,182	-5,604	-23,847	-5,651
17	2. Portfolio investment	-5,864	-8,798	-12,148	-11,468
18	3. Financial Derivatives	134	822	-410	-1,156
19	4. Other investment	-3,292	-2,141	24,414	16,149
20	Net errors and omissions	-7,342	-8,744	9,123	6,048
21	Overall balance	7,266	13,583	18,353	-7,097
(22)	Official Reserve Account (RA)	-7,266	-13,583	-18,353	7,097

* CA surplus means TI is net foreign inv
↳ not desirable some time e.g. slow economic growth & high private saving in JP

2 main roles of CB : ① Monetary authority (implement monetary policy) → set policy int rate → influence money supply & ex rate → control inflation ↔ conflict
② Lender of last resort → inject liquidity → cause TI to out of control

▶ Exchange rate Regimes : IMF : lender of last resort for CB

1) Floating : - Free float [US]
- managed float [TH, Singapore]

2) Intermediate rate : - Band (target zone) [EMS]
- Crawling peg with band [Belarus, Romania]
- Crawling peg [Bolivia, Honduras]
- peg with band [Denmark]
- Conventional peg [Iraq]

3) Fixed exchange rate : - Currency board [HK]
- Dollarization [Ecuador]
- Currency Union [EUR]

• lose independence of domestic monetary policy
• CB less power on money base

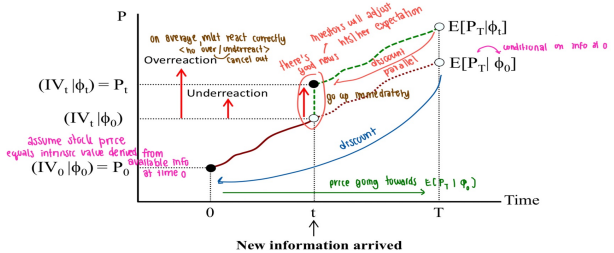
→ foreign currency is adopted as legal tender for domestic transaction

& lender of last resort

role ของ ธนาคาร: Monetary authority / currency board

keep amount of MB in line with foreign reserve assets at fixed EX rate

Information, Expectations and Security Prices



Without new information, security price movement should be smooth and the return is predictable.