

Open Economy: Basic Concepts

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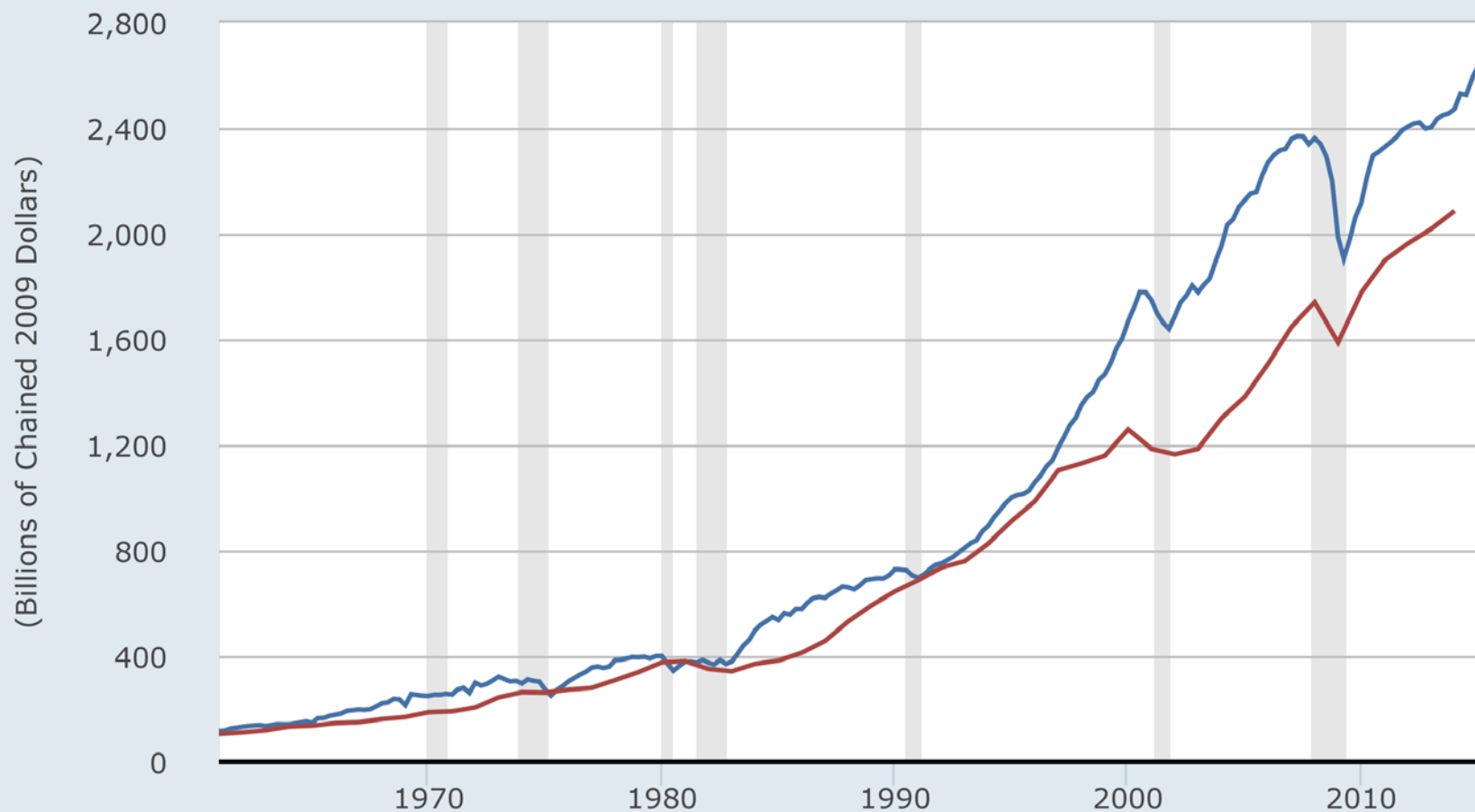
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I. Introduction

- Assume Open Economy $\Rightarrow NX \neq 0$
 - Previously: Closed Economy $\Rightarrow NX = 0$
- LR Open Economy
 - Practical & Useful
- WTO, NAFTA, GATT, ...
 - Increased international trade & globalization
 - Internationalization of the US economy (see next figure)

— Real imports of goods and services
— Real Exports of Goods & Services



Shaded areas indicate US recessions - 2015 research.stlouisfed.org

II.A. Nominal Exchange Rate (e)

e = Nominal exchange rate = The rate at which a person can trade the currency of one country for the currency of another

- Airport foreign currency exchange (FX) terminal
- From the US perspective:
 - 1 USD = 120 Yen $\Rightarrow e = 120 \text{ Yen/USD}$
 - 1 USD = 8.25 Krona $\Rightarrow e = 8.25 \text{ Krona/USD}$
- From the foreign countries perspective:
 - 1 Yen = $1/120$ USD $\Rightarrow e_{\text{japan}} = 0.0083 \text{ USD/Yen} = 0.83 \text{ cents/Yen}$
 - 1 Krona = $1/8.25$ USD $\Rightarrow e_{\text{swdn}} = 0.12 \text{ USD/Krona}$

Currency Appreciation & Depreciation

- $e_1 = 120 \text{ Yen/USD} \rightarrow e_2 = 150 \text{ Yen/USD}$
 - “USD has appreciated”
- $e_1 = 8.25 \text{ krona/USD} \rightarrow e_2 = 7 \text{ krona/USD}$
 - “USD has depreciated”
- E.g. If the Chinese Yuan depreciates relative to the USD
 - \Rightarrow USD appreciates or e increases
 - \Rightarrow One USD purchases more Yuan

Euros per 1 Swiss franc

EUR per 1 CHF

19 Oct 2013 00:00 UTC - 19 Oct 2015 18:12 UTC

CHF/EUR close: **0.92344** low: **0.80768** high: **1.01826**



II.B. Real Exchange Rate (E)

E = Real exchange rate = The rate at which a person can trade the goods and services in one country, for the goods and services of another

- E.g.: US and Swiss watches

$P_{\text{dom}} = \$100/\text{US watch}$, $P_{\text{for}} = 300 \text{ Francs}/\text{Swiss watch}$

$e = 1.5 \text{ Francs}/\text{USD} \Rightarrow e * P_{\text{dom}} = 150 \text{ Francs}/\text{US watch}$

2 US watches = 1 Swiss watch

1 US watch = $\frac{1}{2}$ Swiss watch

$\Rightarrow E = \frac{1}{2} \text{ Swiss Watch}/\text{US Watch}$

Converting from e to E

$$E = e * \frac{P_{dom}}{P_{for}} = e * P_{dom} \left(\frac{1}{P_{for}} \right)$$

$$\text{Units: } \left(\frac{\text{Francs}}{\text{USD}} \right) \left(\frac{\text{USD}}{\text{US Watch}} \right) \left(\frac{1}{\frac{\text{Francs}}{\text{Swiss Watch}}} \right)$$

$$\text{Units: } \left(\frac{\text{Francs}}{\text{USD}} \right) \left(\frac{\text{USD}}{\text{US Watch}} \right) \left(\frac{\text{Swiss Watch}}{\text{Francs}} \right)$$

$$\text{Units: } \left(\frac{\text{Swiss Watch}}{\text{US Watch}} \right)$$

Note: Holding P_{dom} and P_{for} constant,
 \Rightarrow e and E move together

II.B. Purchasing Price Parity

PPP = Purchasing Price Parity = A theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries

- Rationale: Otherwise arbitrage opportunity exists
- Show by contradiction:
 - Suppose \$1 USD purchases 2 US apples ($P_{US} = \$0.50/\text{US apple}$), and \$1 USD once converted to Francs purchases 1 Swiss apple ($e = 1.5 \text{ Francs/USD}$, $P_{\text{Swiss}} = 1.5 \text{ francs/Swiss apple} = \$1/\text{Swiss apple}$)
 - Opportunistic arbitrageur:
 - \$1, buy 2 US apples. Sell them in Switzerland for \$1 apiece
=> profits = \$0.50/apple
 - Demand for US apples increase => P_{US} increases
 - Supply for Swiss apples increase => P_{Swiss} decreases

Purchasing Price Parity

- \$1 USD with a price level P_{dom} purchases:

$$\frac{1}{P_{dom}} \left(\frac{\frac{USD}{USD}}{\frac{US\ Good}{US\ Good}} = US\ Goods \right)$$

- \$1 USD converted to foreign currency purchases:

$$\frac{1 * e}{P_{for}} \left(\frac{\frac{Francs}{Francs}}{\frac{Swiss\ Good}{Swiss\ Good}} = Swiss\ Goods \right)$$

- PPP =>

$$\frac{1}{P_{dom}} = \frac{1 * e}{P_{for}}$$

Purchasing Price Parity

$$\frac{1}{P_{dom}} = \frac{1 * e}{P_{for}}$$

$$1 = e * \frac{P_{dom}}{P_{for}}$$

$$E = e * \frac{P_{dom}}{P_{for}}$$

- PPP => E = 1

PPP as a First Theory of E

- Assumptions & Limitations
 - Transportations costs are 0
 - Oil vs natural gas, Tropical fruit, NY vs French haircuts
 - Goods are perfect substitutes
 - US watch vs Swiss watch, Italian Leather vs US Leather

III.A. Exports (X)

$$X = f(E, Y_{for}, Tastes_{dom\ goods}, TradePolicy_{for}, \dots)$$

Y_{for} = Income abroad

$TradePolicy_{for}$ = Tariff & quotas on American imports by foreign countries

- The US exports beef to Asia
 - 2003 mad cow disease
 - => Asian import ban on US beef
 - => X decrease

III.B. Imports(IM)

$$IM = f(E, Y_{dom}, Tastes_{for\ goods}, TradePolicy_{US}, \dots)$$

Y_{dom} = Income at home

$TradePolicy_{US}$ = Tariff & quotas on foreign imports by the US

- 2009: US imposes 35% tariff on tires made in China
 - IM decrease
 - Obj: Increase tires made in the US and increase jobs
 - [Unintended Consequence: Tires manufacturing shifts to other low-wage country]

FX Market. Demand for USD: $NX(E) = X(E) - IM(E)$

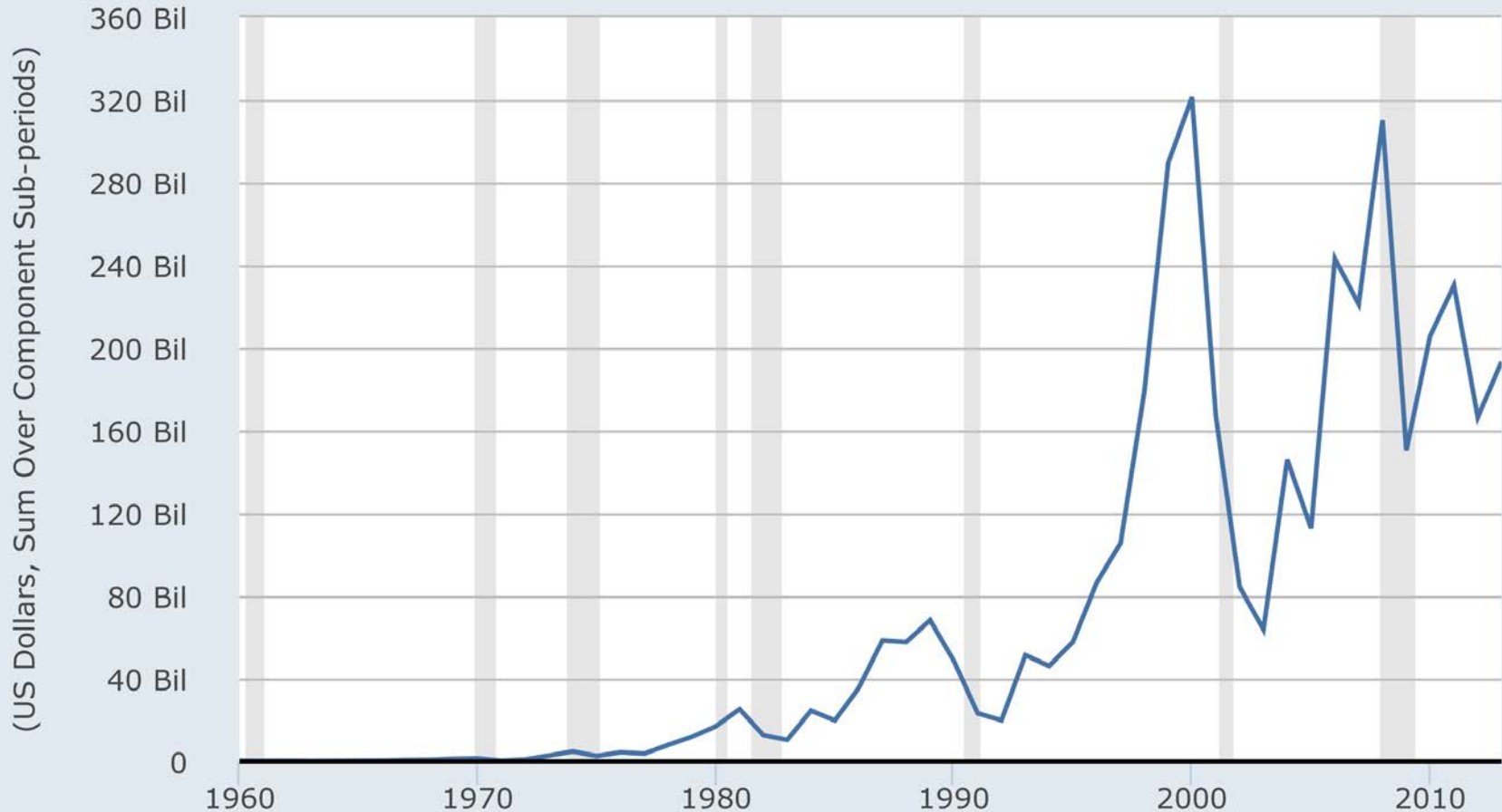
Trade Balance

- Trade balance: $NX = X - IM$
- Trade surplus: $X > IM$
- Trade deficit: $X < IM$
- Balanced trade: $X = IM$
- Trade balance = Current account balance
- Mid-1980s, trade deficits increased significantly because e/E both increase =>
 - US goods relatively more expensive
 - Foreign goods relatively cheaper

IV. Net Capital Outflow (NCO)

- FDI: Foreign Direct Investment (see next graph)
 - E.g. GE owns and operates a plant in India
 - Stable foreign investment
 - 2010: FDI *into* US \$19B. Primarily real estate. Switzerland, UK, Japan, France, Germany, Luxembourg, Netherlands, Canada.
- FPI: Foreign Portfolio Investment
 - E.g. US resident purchases stocks and bonds in an Indian Motor Company
 - Unstable foreign investment or “hot” money
- FDI, or FPI?
 - French wine, Swiss bonds, Swiss watches, French real estate

— **Financial Account: Liabilities: Direct Foreign Investment in Reporting Country for the United States©**



Source: Organization for Economic Co-operation and Development

Shaded areas indicate US recessions - 2015 research.stlouisfed.org

US residents purchasing foreign assets abroad, for reporting countries

Net Capital Outflow (NCO)

NCO = (Purchases of foreign assets by domestic residents)
– (Purchases of domestic assets by foreigners)

$$NCO = f(r_{dom}, r_{for}, risk_{for}, GvtPolicy_{asset\ ownshp})$$

$r_{dom} = r$ = Domestic real interest rate

r_{for} = Foreign real interest rate

$GvtPolicy_{asset\ ownshp}$ = Government policies on foreign asset ownership

E.g. Foreigners are not allowed to purchase land in many countries => local banks as proxies