Intermediate Macroeconomics (UN3213)
Recitation 11

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Q1

- Firm's profit maximization

$$\max_{I_1} \quad 2\sqrt{I_1} - (1 + r_1)I_1$$

Take FOC and solve.

$$I_1^* = I(r_1) = \frac{1}{(1 + r_1)^2}, \quad \Pi_2(r_1) = \frac{1}{1 + r_1}$$

- Optimal consumption

$$C_1^* = \frac{1}{2} \cdot \frac{1}{1 + \tau_1} \left[Y_1 + \frac{\Pi_2(r_1)}{1 + r_1} \right] = \frac{0.5}{1 + \tau_1} \left[4 + \frac{1}{(1 + r_1)^2} \right]$$

$$C_2^* = \frac{1}{2} \cdot \frac{1 + r_1}{1 + \tau_2} \left[Y_1 + \frac{\Pi_2(r_1)}{1 + r_1} \right] = 0.5 \left(\frac{1 + r_1}{1 + \tau_2} \right) \left[4 + \frac{1}{(1 + r_1)^2} \right]$$

Q1

- Derive the saving schedule.

$$S_1(\tau_1, r_1) = Y_1 - G_1 - C_1^* = 3 - \frac{0.5}{1+\tau_1}\left[4 + \frac{1}{(1+r_1)^2}\right]$$

- Solve for equilibrium: $S_1(r_1^*) = I(r_1^*)$

$$r_1^* = r_1(\tau_1) = \left(\frac{1.5+\tau_1}{1+3\tau_1}\right)^{0.5} - 1.$$

  For $\tau_1 = 0.25$, we obtain $r_1^* = 0, C_1^* = 2$.

- To solve for τ_2, use the government's intertemporal budget constraint.

$$G_1 + \frac{G_2}{1+r_1^*} = \tau_1 C_1^* + \frac{\tau_2 \cdot C_2^*(\tau_2, r_1^*)}{1+r_1^*}$$

  $\tau_2 \approx 0.39, C_2^* \approx 1.74$.

- Repeat steps with $\tau_1 = 0.2$ for Q2.

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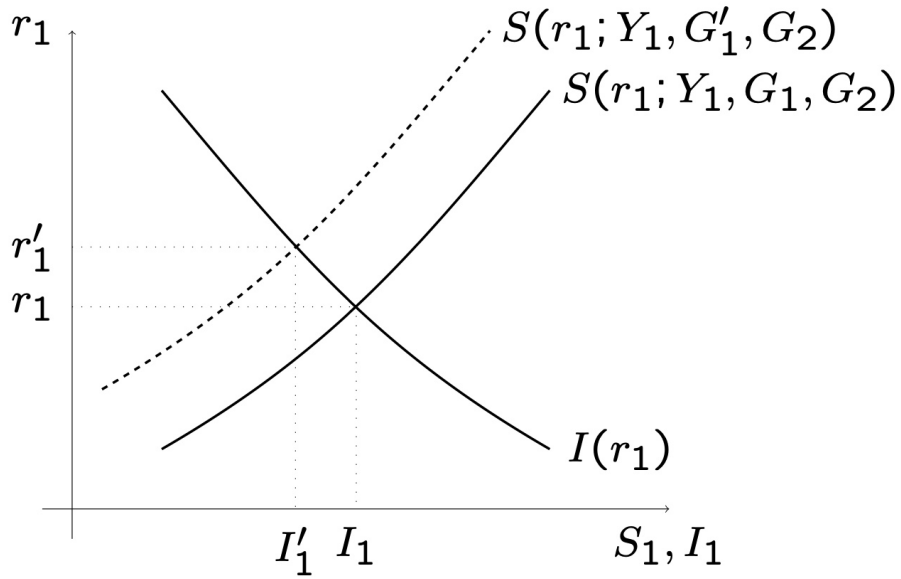
Spending shock in period 1

- Recall the expression for national saving:

$$S_1 = \frac{1}{2}\left[Y_1 - G_1 - \frac{\Pi_2(r_1) - G_2}{1 + r_1}\right]$$

  When G_1 goes up, saving goes down. Less resources available in period 1 $\rightarrow$ less incentive to save.

- Equilibrium interest rate rises to clear up the excess demand:



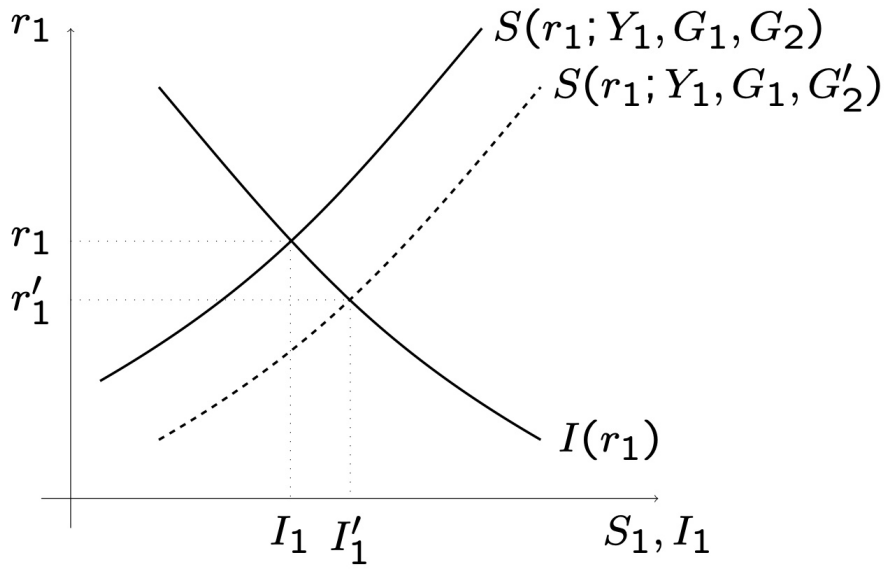
Spending shock in period 2

- Recall the expression for national saving:

$$S_1 = \frac{1}{2}\left[Y_1 - G_1 - \frac{\Pi_2(r_1) - G_2}{1 + r_1}\right]$$

  When G_2 goes up, saving goes up. Less resources available in period 2 $\rightarrow$ more incentive to save.

- Equilibrium interest rate falls to clear up the excess supply:



Financing with distortionary taxes

- Suppose the government levies a proportional consumption tax to balance its budget in every period, i.e.

$$G_1 = \tau_1 C_1, \quad G_2 = \tau_2 C_2$$

- Recall optimal period 1 consumption under a proportional tax:

$$C_1 = \frac{1}{2} \cdot \frac{1}{1+\tau_1} \left[Y_1 + \frac{\Pi_2(r_1)}{1+r_1} \right]$$

- The saving schedule does not depend on G_1, G_2.

$$\begin{aligned} S_1 &= Y_1 - (C_1 + G_1) \\ &= \frac{1}{2} \left[Y_1 - \frac{\Pi_2(r_1)}{1+r_1} \right] \end{aligned}$$

  Spending shocks have no effect on interest rate or investment.

- $G_1 \uparrow \implies C_1 \downarrow$, since $C_1 = Y_1 - I_1 - G_1$

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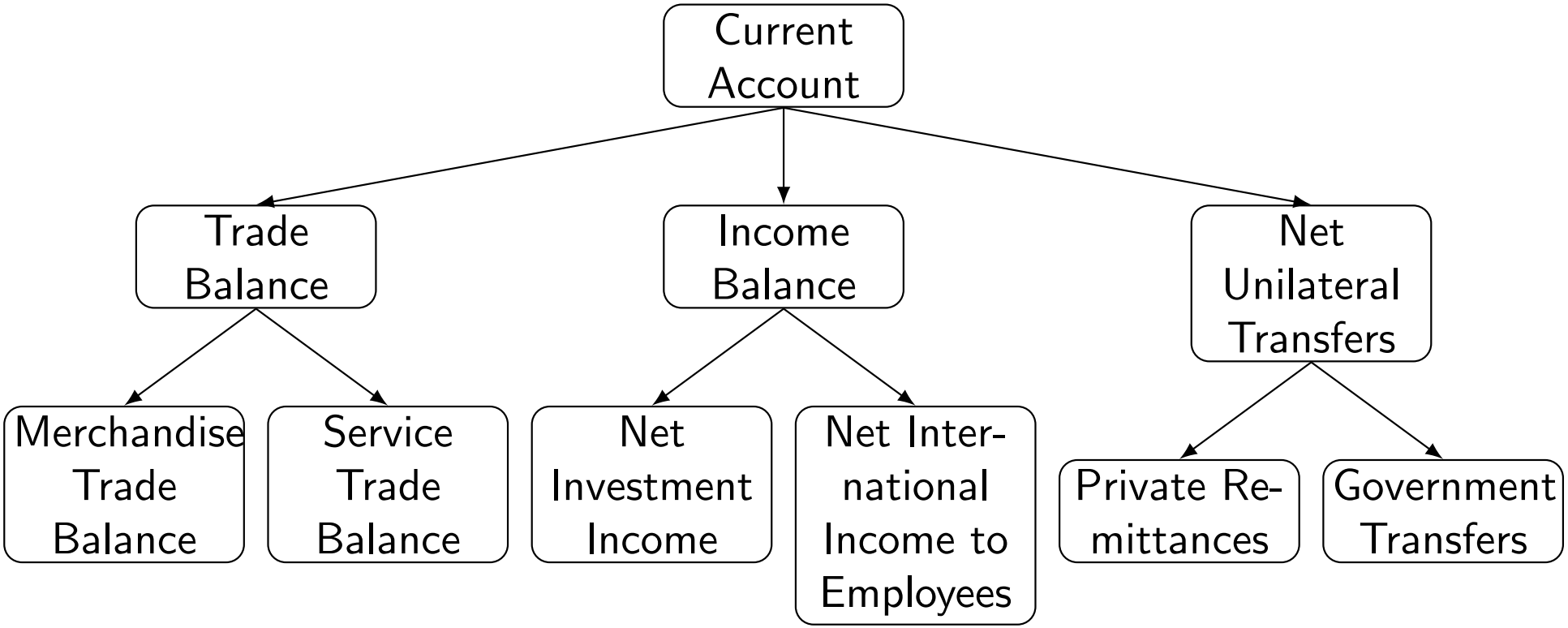
Balance-of-Payments

- A record of a country's international transactions: complied by the Bureau of Economic Analysis for the US
- BoP has three components:

$$\begin{aligned}\text{Balance of Payments} &= \text{Current Account} \\ &+ \text{Financial Account} \\ &+ \text{Capital Account}\end{aligned}$$

- What do they record?
  - **Current account:** Exports and imports of goods and services and international receipts,
  - **Financial account:** Sales of assets to foreigners and purchases of assets located abroad,
  - **Capital account:** Capital transfers, mainly debt forgiveness and migrants' transfers as they leave the country. or payments of income

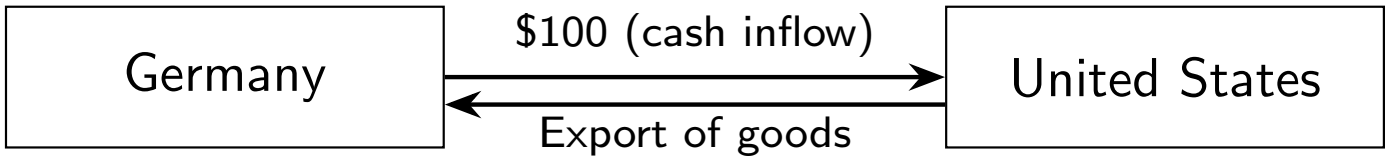
Current Account



a. Merchandise Trade Balance = Exports of Goods - Imports of Goods
b. Service Trade Balance = Exports of Services - Imports of Services
c. Trade Balance = Merch. Trade Balance + Service Trade Balance

Double-entry bookkeeping

- All international transactions appear as **two entries in BoP accounts**, once as a credit, once as a debit.
- *Example 1:* A US company exports $100 dollars worth of machinery to Germany.



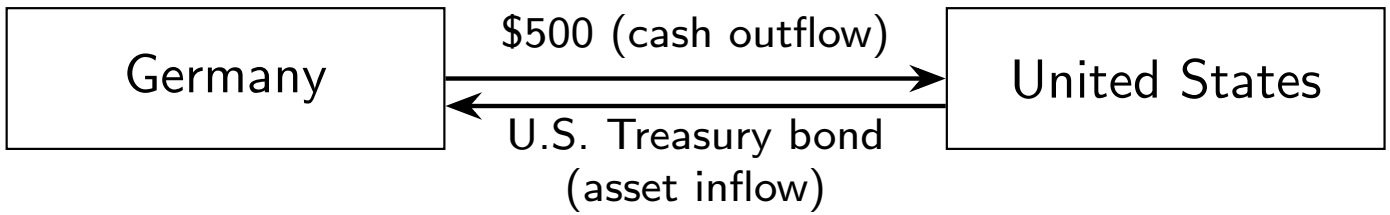
U.S. Balance of Payments Entries:

- Current Account (Credit): +100 [Export of goods]
- Financial Account (Debit): –100 [Foreign assets: cash inflow]

Total: 0 (Balanced)

Double-entry bookkeeping

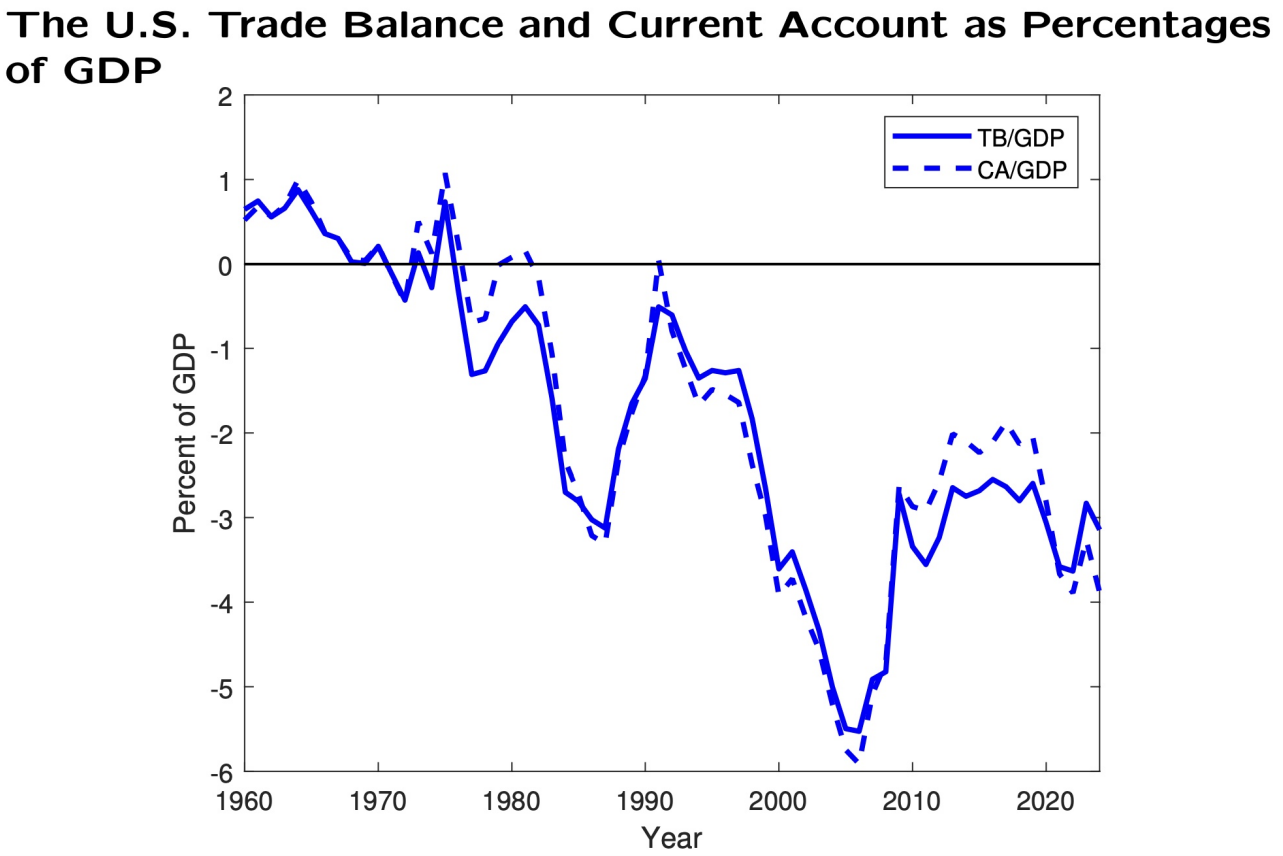
- All international transactions appear as **two entries in BoP accounts**, once as a credit, once as a debit.
- *Example 2:* Germany buys $500 worth of US government bonds



U.S. Balance of Payments Entries:
- Financial Account (Credit): +500 [Bond sold to foreigner]
- Financial Account (Debit): –500 [Cash inflow]

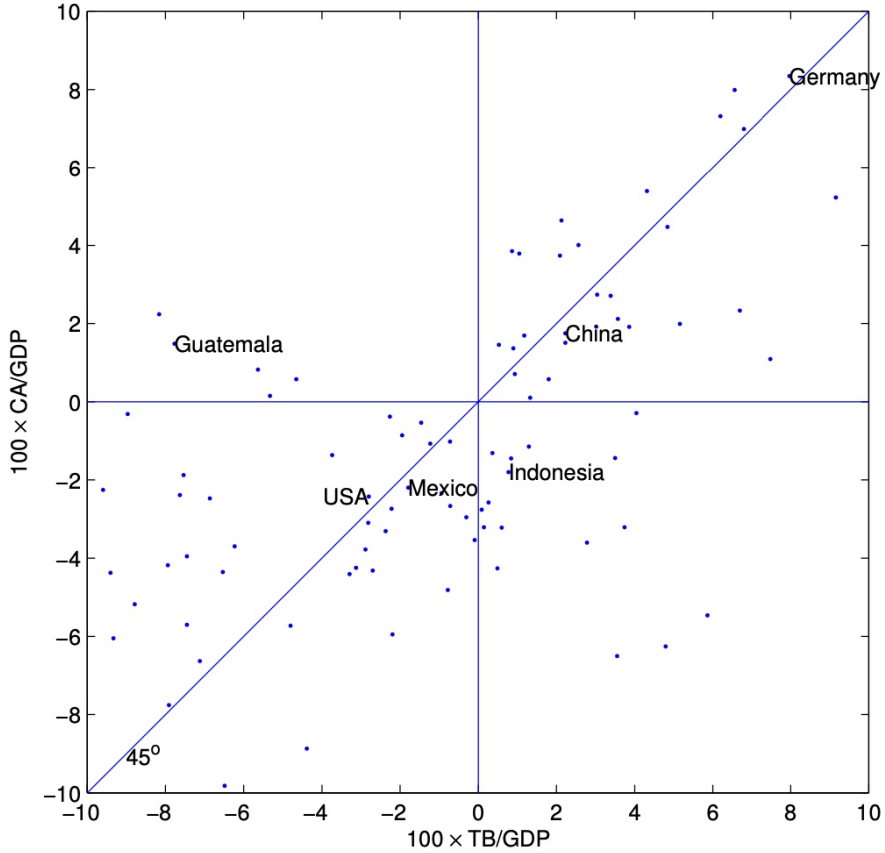
Total: 0 (Balanced)

Trade Balance and Current Account: US



- Trade balance accounts for the bulk of the US current account
- The US generally has a merchandise trade deficit and a service trade surplus.

Trade Balance and Current Account: Other countries



- A strong correlation between trade balance and current account is observed in a cross-section of countries.

Trade Balance and Current Account: Three cases

Country	TB/GDP (%)	CA/GDP (%)
Germany	8.0	8.3
Indonesia	0.8	-1.8
Guatemala	-7.8	1.5

- For Germany, $\frac{CA}{GDP} > \frac{TB}{GDP} > 0$ because Income Balance > 0. Germany is a net creditor, so it receives interest income from the rest of the world.
- For Indonesia, $\frac{TB}{GDP} > 0 > \frac{CA}{GDP}$ because Income Balance < 0. Indonesia is a net debtor, so it makes interest payments to the rest of the world.
- For Guatemala, $\frac{TB}{GDP} < 0 < \frac{CA}{GDP}$ because Net Unilateral Transfers > 0 due to personal remittances of Guatemalans working in the US.

Net International Investment Position

- Difference between the foreign asset position (A) and the foreign liability position (L):

$$NIIP = A - L$$

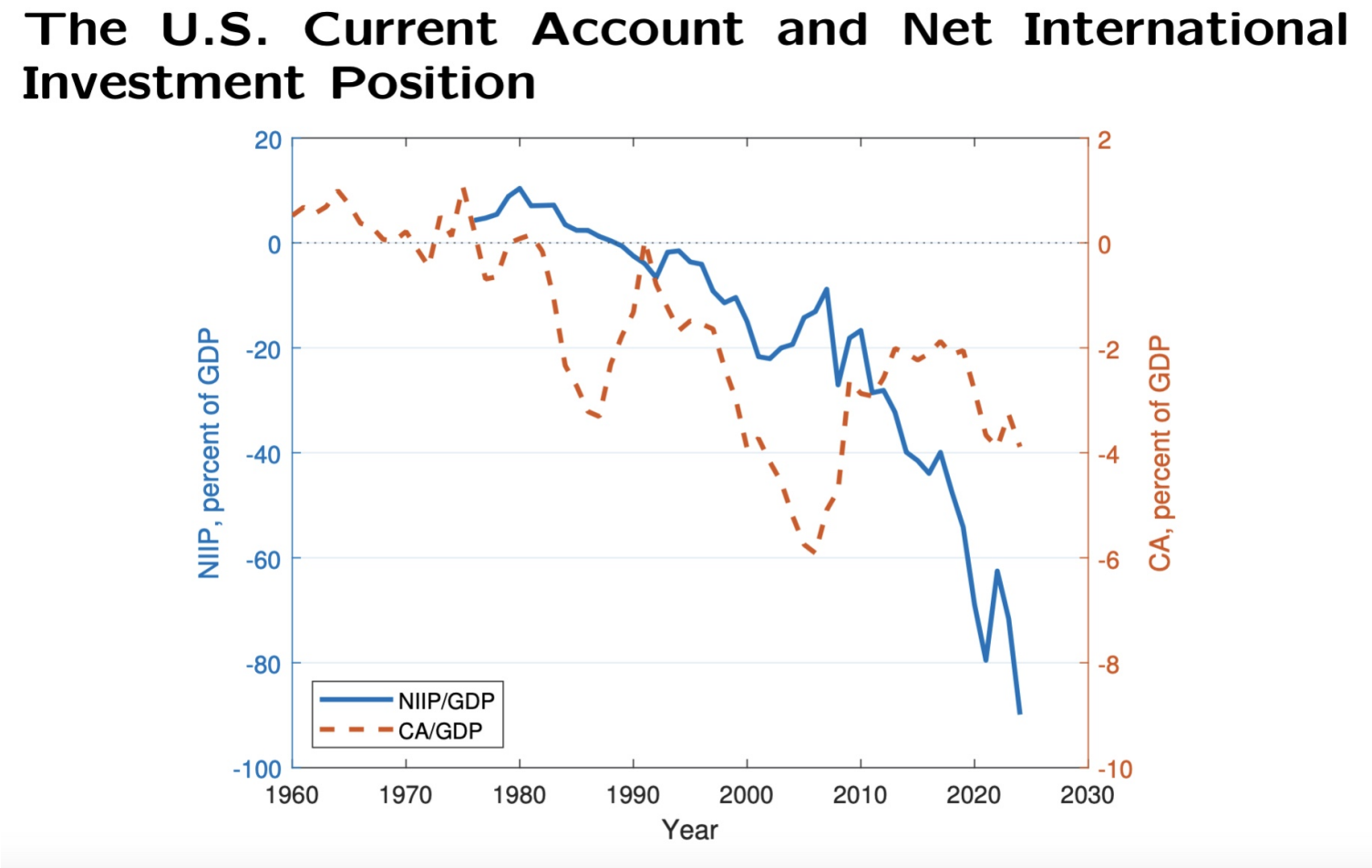
- Country is a net international creditor if $NIIP > 0$, and a net debtor if $NIIP < 0$
- NIIP is a stock while CA is a flow variable:

$$\Delta NIIP = CA + \text{valuation changes}$$

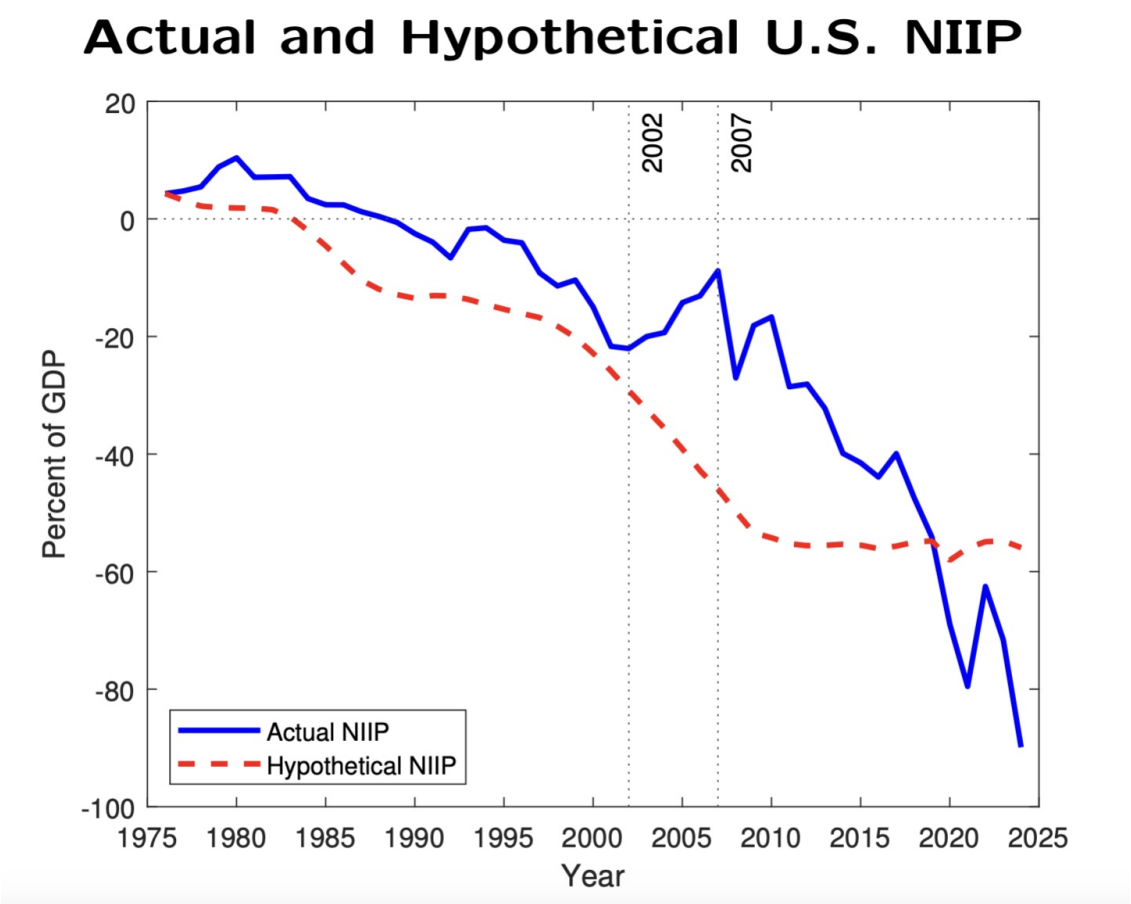
Hypothetical NIIP: What the NIIP would have been without any valuation changes

$$NIIP^H_{2000} = NIIP_{1976} + CA_{1976} + CA_{1977} + \cdots + CA_{2000}$$

NIIP time series



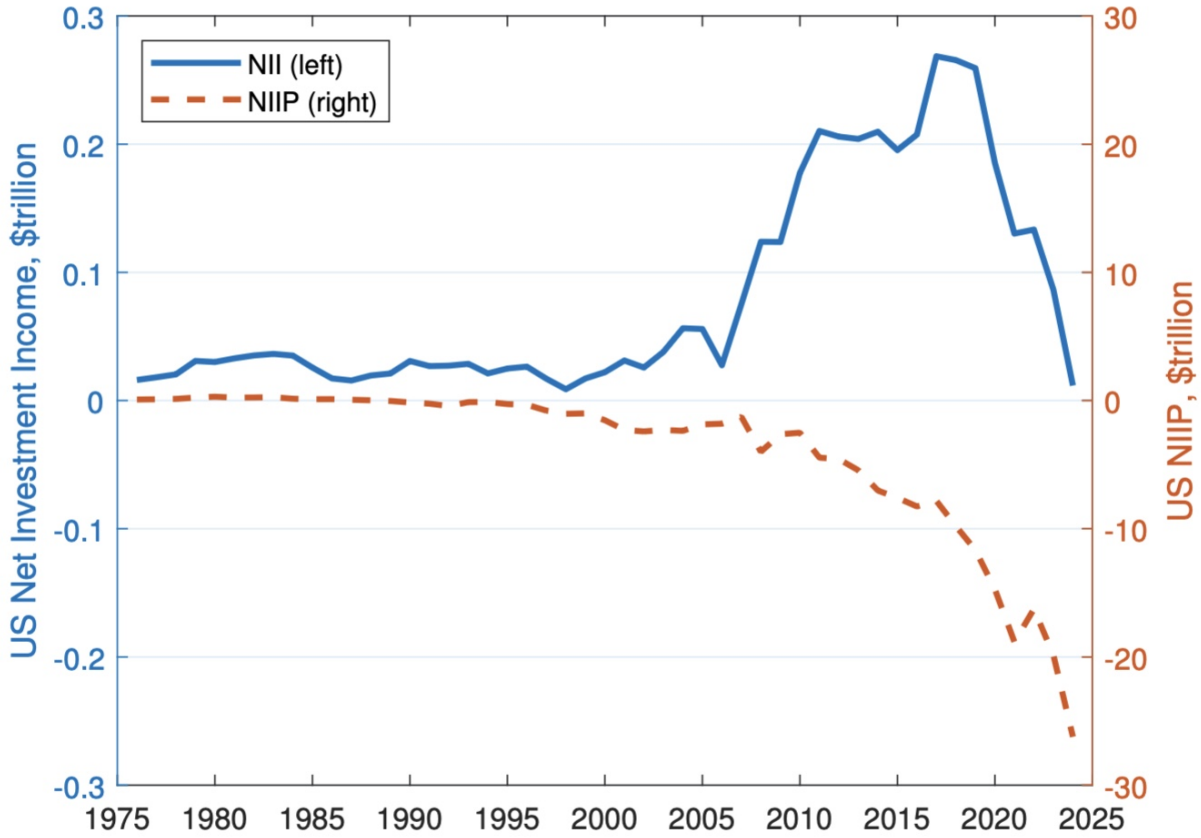
NIIP time series



$$NIIP_{2000} = NIIP^{H}_{2000} + \sum_{t=1976}^{2000} ValutationChanges_t$$

NII-NIIP paradox

- Despite having a large negative international investment position ($NIIP < 0$), the US receives positive investment income from RoW ($NII > 0$).



NII-NIIP paradox explanations

There are two hypotheses:

- **Dark matter:** A part of the true NIIP is unaccounted, e.g. intangible capital. Uses the observed rate of return to infer the true NIIP

$$NII = r \cdot TNIIP$$

- **Return differentials:** Interest rate payable on international liability position is lower than interest rate earned on foreign asset position. Uses observed positions A and L to infer rates of return.

$$NII = r_A \cdot A - r_L \cdot L$$

Even though $A - L < 0$, $r_A > r_L$ such that $NII > 0$