

Lecture notes on money, finance, risk management, and public policy

International financial imbalances

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Overview of international imbalances

Characteristics of international imbalance

Causes of international imbalance

Overview of international imbalances

International financial imbalances and stability

The role of the current account in international imbalances

Characteristics of international imbalance

Current account imbalances

Rising global debt

The role of the U.S. dollar in international finance

Financial market development

Arbitrage limitations in global money markets

Currency crises

Causes of international imbalance

U.S. dollar, current account deficits, and international imbalances

Global savings glut

Trade policies

The global financial cycle

Globalization and international financial imbalances

- Aspects of globalization

Economic: increase in volume of international trade, integration of labor, service and product markets, cross-border supply chains

Financial: increase in volume of international capital flows, integration of local into international financial markets

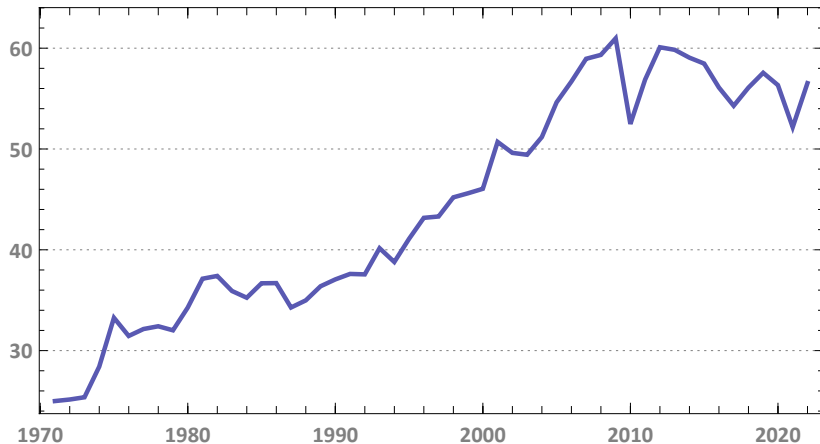
- Analytical points of view

Macroeconomic: saving, investment, growth

Financial: balance sheets, credit expansion and risk taking

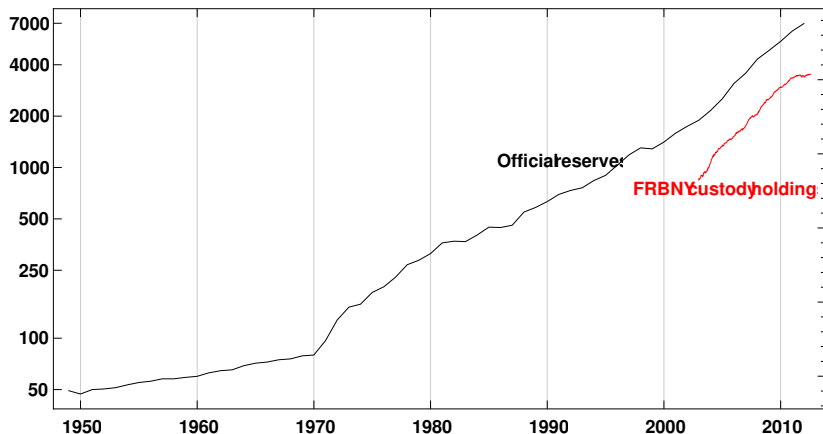
- International financial markets can transmit/amplify financial shocks
 - Through international transactions and capital flows and through valuation of foreign assets
 - Amplification of banks' leveraging and deleveraging
 - Transmission of monetary policy

World trade relative to GDP



Sum of exports and imports of goods and services as a share of gross domestic product, annual, 1970 to 2016. *Source:* World Bank [NE.TRD.GNFS.ZS].

International monetary reserves 1948–2012



Black plot: Official Reserve Assets, annual, billions of Special Drawing Rights (SDRs), logarithmic scale. On August 31, 2012, one SDR was worth about \$1.52. Red plot: Marketable securities held in custody by the Federal Reserve Bank of New York for foreign official and international accounts, week average. SDRs are a currency unit introduced by the IMF in 1969 as a means of increasing its flexibility to provide liquidity to countries experiencing balance of payments problems. Today, it serves primarily as a unit of account. *Source:* International Monetary Fund, Federal Reserve Board, release H.1.4.

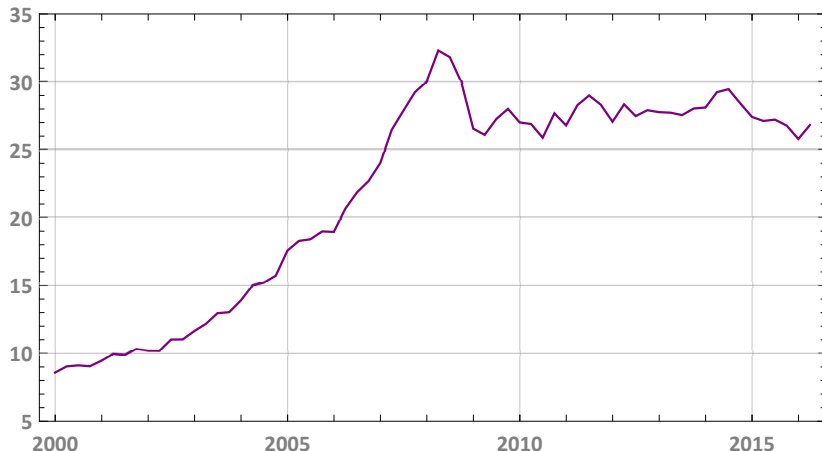
Economic globalization

- Rise in international trade
 - Accompanies income growth and increased international specialization
 - Removal of tariffs, other protectionist measures (GATT, WTO)
- Increase in cross-border banking activity
 - Bank lending to obligors in other countries
 - Establishment of bank branches and subsidiaries in other countries
 - Ownership shares in banks domiciled in other countries
- Large increase in activity of U.S. affiliates (branches and offices) of foreign banks
 - Large-scale U.S. dollar deposit-gathering
 - Lent in large part to U.S. residents and entities
 - Large participants in interbank markets

Gross capital flows and international imbalances

- Rapid growth of gross cross-border financial flows
 - Large increase in both borrowing and lending—capital inflows and outflows—in most regions
 - Focus on current account with E. Asia, but European gross flows larger than Asian
- Gross flows be dissociated from CA/net flows but have large impact on financial conditions
 - Large borrowers may be large lenders

Bank lending to foreign obligors 1999–2016



BIS consolidated banking statistics, total foreign claims by immediate counterparty, quarterly, \$ trillions, Q4 1999 to Q1 2016. The data represent the total amount lent by banks domiciled in one country to residents of another, including by foreign affiliates resident in the borrower's country. *Source:* Bank for International Settlements.

Dimensions of international financial imbalances

Current account balance: broad measure of income received from and payments made to rest of the world

Gross capital flows: cross-border acquisition of assets and liabilities

Net foreign assets: international indebtedness, ownership of domestic assets by non-residents

U.S. dollar indebtedness of non-U.S. residents in context of predominance of USD in international transactions

Balance of payments: current and financial accounts

- **Balance of payments** (BOP): system of double-entry accounts
 - Records economic transactions between countries/regions
 - Flows of money recorded on one side, offsetting goods, services or assets exchanged for it—or a transfer—on the other
- **Current account** balance (*CA*): sum of two balances of in- and outflows:
 - **Trade balance**: exports X less imports M of goods and services
 - Net cross-border income:
 - **Primary income balance**: investment income, employee wages, taxes
 - **Secondary income balance** or **net unilateral transfers**, e.g. workers' remittances, gifts

$$CA = X - M + \text{net foreign income}$$

- **Financial account** balance (*FA*): net acquisition (or diminution of stock) of financial assets
 - **Net investment flows**
 - Changes in **official foreign exchange reserves**

Balancing the balance of payments

- Current account balance offset by financial account balance:
 - Current account deficit (–) regions “pay” for goods and services by incurring liabilities (+)
 - Current account surplus (+) regions acquire foreign assets (–)
- $$CA + FA = 0$$
- Current and financial accounts reconciled via **statistical discrepancy**
 - Overall “balance” of BOP includes generally small capital transfers
 - Current account balances of all countries/regions sum to zero
 - Apart from measurement issues and statistical discrepancy
 - Classification of flows depends on uses of balance of payments
 - Official reserves less sharply distinguished today from other financial flows, e.g. sovereign wealth funds, national pension funds

National income and the balance of payments

- BOP linked to **national accounts** of each country
- **Gross domestic product** (GDP)—output in a country/region—is used for, and generates income from,
 - Consumption (C)
 - Investment (I)
 - Government purchases: spending other than transfer payments (G)
 - Net exports ($X - M$)
- **National income** Y adds income from foreign sources to GDP:

$$Y = C + I + G + CA$$

- The part of income not consumed equals private saving S plus taxes other than those used in transfers (T):

$$Y - C = S + T = I + G + CA$$

The current account and net assets

- Capital flows finance **net saving** shortfall $I - S$ and public deficit $G - T$:

$$FA = -CA = I - S + G - T$$

- Cumulative current account balances drive **net international investment position** (NIIP)
 - Current account: surplus—positive net saving—increases NIIP
$$\Delta NIIP = CA + \text{valuation changes}$$
- Valuation of existing NIIP: asset price and exchange rate fluctuations
 - Valuation changes can be large relative to CA and offset CA

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Global savings glut

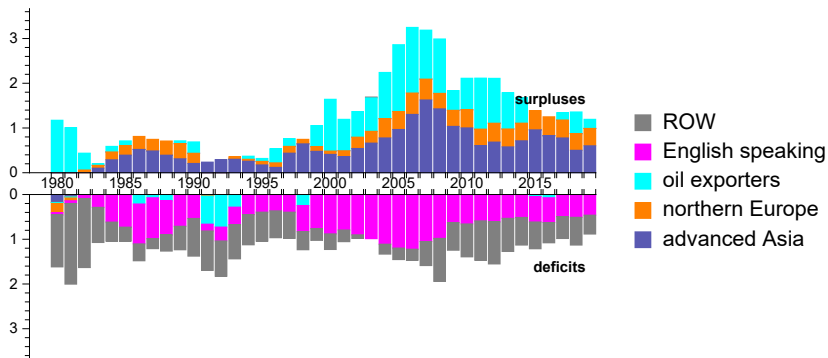
Trade policies

The global financial cycle

Prevalence of current account imbalances

- Many countries have large and persistent current account surpluses or deficits
 - Patterns change widely over time
- Bretton Woods: initial U.S. surpluses followed by deficits
- Early floating era 1971–: persistent surpluses of northern Europe, oil exporters
- Shifting patterns since “Great Moderation” of early 1980s
 - Persistent deficits: English-speaking and many developing or middle-income countries
 - Persistent surpluses: advanced East Asian regions, northern Europe, and oil exporters

Current account imbalances 1980–2019



Current account balances grouped by region, percent of world GDP. Advanced Asia: China, Japan, Hong Kong SAR, Korea, Macao SAR, Singapore, Taiwan; Northern Europe: Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Sweden, Switzerland; Oil exporters: Algeria, Azerbaijan, Iran, Kazakhstan, Kuwait, Nigeria, Oman, Qatar, Russia, Saudi Arabia, United Arab Emirates, Venezuela; English-speaking: Australia, Canada, New Zealand, United Kingdom, United States. *Source:* International Monetary Fund, World Economic Outlook, April 2020.

Consequences of current account imbalances

- Deficit regions experience:
 - Depreciating currency or devaluation pressures
 - Pressure to follow offsetting contractionary monetary and fiscal policies
 - High/rising levels of foreign debt
- Surplus regions experience:
 - Appreciating currency or appreciation pressures
 - Pressure to follow offsetting expansionary policies
 - High/rising holdings of foreign assets, including reserves
- Concern about local and global, economic and financial stability impact of growing debt

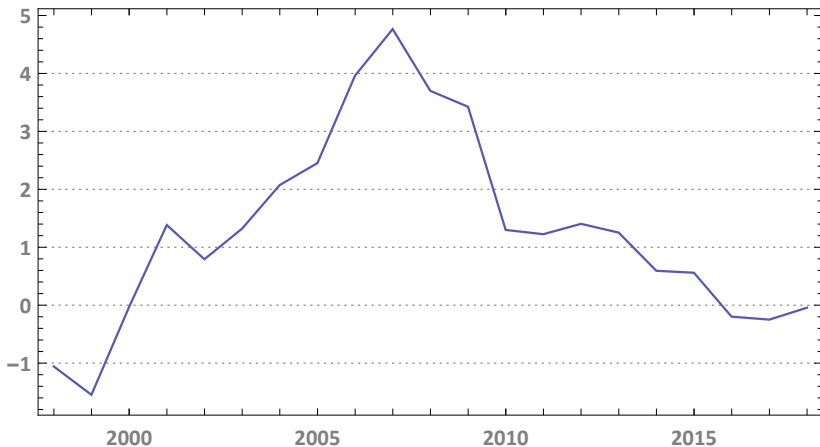
Asymmetry between surplus and deficit regions

- Adjustments of deficit regions more painful
 - Deficit regions must devalue or deflate
 - → Build precautionary reserves with contractionary effects
- Markets force adjustment
 - Deficit regions vulnerable to **speculative attack** if deficit considered unsustainable
- Deficit regions seek protection from (→) **sudden stop** in capital inflows
 - Consequence of **original sin**, borrowing in foreign currency due to inability to borrow abroad in domestic currency
 - → Vulnerability of countries with large-magnitude negative *NIIP*
- Asymmetry said to induce contractionary bias in international financial system

Uphill capital flows to developing economies

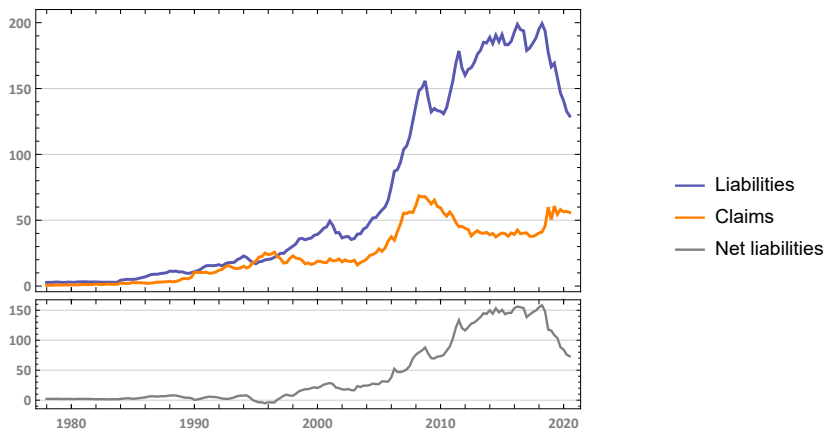
- Historical norm: investment by advanced economies drives financial account surpluses in developing economies
 - Corresponding to current account deficits (surpluses) in developing (advanced) economies
- Contrary pattern in recent decades: **Lucas paradox** of “uphill capital flows”
 - Current account surpluses in emerging market countries, particularly East Asia, deficits in U.S.
 - Accumulation of U.S. assets, flip side of savings “pushed” into U.S.
- Impact: developed-world surpluses depress interest rates (→global savings glut, conundrum)
- Contributes to loose financial conditions in U.S.
- Capital inflows→additional vulnerabilities in emerging markets

Developing economy current account balances



Emerging market and developing economies, current account balance, percent of GDP, 1997 to 2017. *Source:* International Monetary Fund, World Economic Outlook Database, October 2018.

Net liabilities of Turkey 1977–2020



Cross-border liabilities and claims, bill. USD, Q4 1977–Q2 2020. *Source:* Bank for International Settlements, locational banking statistics Table A3, cross-border positions, by country (residence).

U.S. dollar as key world currency

USD as trade invoice currency: trade between countries outside U.S. frequently denominated in USD

- Oil trade almost exclusively invoiced in USD

Demand for U.S. assets: investment in U.S. assets by rest of world

Provision of liquidity through short-term borrowing

Provision of “safe” assets, U.S. Treasuries preferred

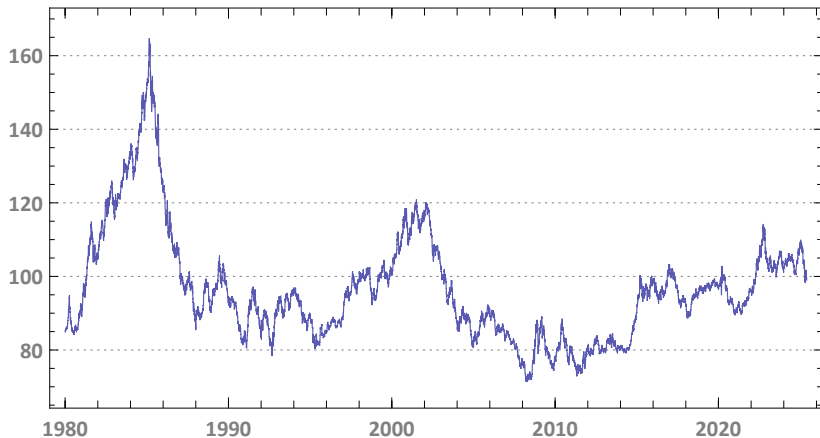
Official foreign exchange reserves and **sovereign wealth funds** predominantly USD-denominated assets

USD-denominated indebtedness of non-U.S. residents

- Non-U.S. private and public USD-denominated debt issuance far in excess of U.S. non-USD denominated debt issuance
- Advanced market economies: satisfy appetite for USD assets
- Emerging markets: lower interest rates than in local currency

Impact of U.S. monetary and fiscal policies on liquidity and credit conditions worldwide

U.S. Dollar Index 1980–2025



ICE U.S. Dollar Index of USD exchange rates against other major currencies, daily, 02Jan1980–27May2025. *Data source:* Bloomberg Financial L.P.

Global intermediation of U.S. dollar assets

- Large role of non-U.S. (esp. European) entities in USD intermediation
 - Borrowers *and* lenders in U.S. money and capital markets
- Two center-of-gravity shifts since the GFC: Europe→Asia and banks→non-banks
 - Prior to GFC: European banks major investors in U.S. subprime securitizations
 - After GFC: non-U.S., esp. East Asian, insurance and other institutional investors acquire U.S. corporate debt
- U.S. as **“world venture capitalist”**: issues short-term USD liabilities, acquires foreign direct investments

U.S. dollar in international banking

- Large presence of foreign banking offices in U.S.
 - Rapid rise in **net interoffice assets** accumulated by foreign banks via U.S. branch offices
 - European banks, esp. state-owned (e.g. IKB), were major investors in U.S. subprime securitizations prior to GFC
- Non-U.S. banks depend on USD (→) short-term wholesale funding (STWF)
 - Non-U.S. banks lack natural USD deposit base
 - E.g. interbank market, commercial paper
 - Prior to GFC: European banks large issuers of USD-denominated commercial paper
 - Held in large part by money market mutual funds
 - But desiccated interbank and financial commercial paper market post-crisis

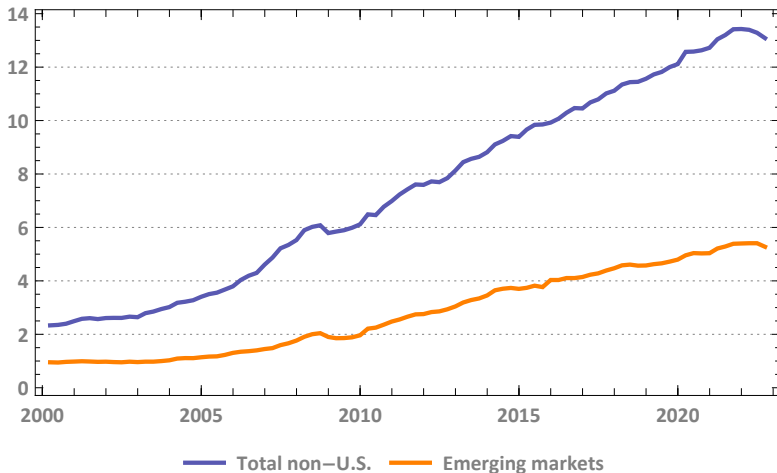
Global banks and U.S. dollar money markets

- Non-U.S. banks intermediate large volumes of USD lending, but lack USD deposit base
 - Currency mismatch→high demand for USD hedges
 - Market segmentation: non-U.S. banks lack USD deposit base
- Pronounced dislocations in non-U.S. banks' USD wholesale funding since crisis, persisting to present
 - Initially coincides with disruption of Libor, Euribor interbank markets
 - Reduced size U.S. money market mutual funds since 2014→reduced demand for non-U.S. banks' commercial paper
- →Federal Reserve **central bank liquidity swaps** 12Dec2007
- →Incomplete arbitrage in forward foreign exchange markets

Managing U.S. dollar risks

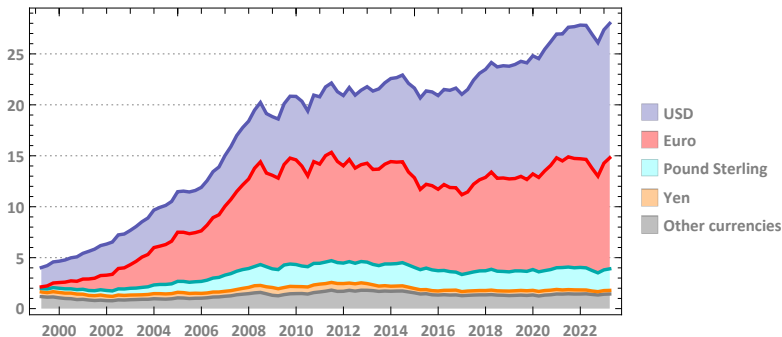
- Non-U.S., esp. European, Japanese banks, run large matched USD books
 - Non-U.S. banks' USD liabilities and assets are *currency*, but not *maturity* matched
- Non-U.S. intermediaries have exposure to two inter-related risks
 - Funding risk:** commercial paper rollover, deposit withdrawals
 - Dependence on Fed liquidity via currency swaps in crises
 - Integrated in U.S. financial system but non-U.S. regulators
 - Conflict situation: who supports Deutsche Bank when its USD STWF is disrupted?
 - USD currency risk** generally smaller, readily manageable
 - Hedged in forward and cross-currency swap markets
- Cross-currency swap markets also a vehicle for USD STWF
→ Cross-currency basis

U.S. dollar lending abroad 2000–2022



US dollar-denominated credit—bank loans and debt securities—to non-bank borrowers outside the United States, amounts outstanding, \$trill., Q1 2000 to Q3 2022. *Source:* BIS global liquidity indicators, Table E2-USD.

International debt securities 1999–2023



Outstanding stock of international debt securities issued outside the local market of the country where the borrower resides, by currency of denomination, \$trill., Q1 1999 to Q1 2023. *Source:* BIS debt securities statistics, Table C3.

U.S. and international imbalances: Bretton Woods

- **Gold exchange standard (Bretton Woods system)** 1944–1971
 - Fixed exchange rates for most currencies vis-à-vis USD
 - Non-U.S. surpluses: central banks—but not private parties—can redeem USD reserves for gold at fixed price
 - Non-U.S. deficits:
 - Temporary imbalances: **International Monetary Fund** support
 - Persistent imbalances: devaluation
 - Rest of world reliance on U.S. creation of USD liquidity
 - U.S. determines world money supply via current account deficits
- **Triffin dilemma:** crisis inevitably emerges from either
 - U.S. surpluses lead to dearth of international liquidity, depression
 - U.S. deficits lead to loss of confidence, run on U.S. gold
- The “minority view”: Bretton Woods system stable
 - U.S. as banker to the world
 - Issues liquid short-term liabilities at least in part to satisfy non-U.S. demand
 - Acquires illiquid long-term foreign assets

Federal Reserve as world's central bank

- Capital mobility → regional interest rates tend to converge
- General world interest rate level strongly influenced by U.S. monetary policy
 - Countries resisting lower interest rates experience exchange rate appreciation, erosion of competitiveness
 - Countries resisting higher interest rates experience capital outflows, vulnerability to speculative attack
- Central bank reserves predominantly U.S. dollar denominated

Higher interest rates in emerging markets

- Emerging markets and developing economies (EMDE) often have
 - Less-developed financial markets than advanced market economies
 - Materially higher interest rates than advanced market economies
- Higher interest rates in emerging markets also mean hedging generally costly
- Mirrored (through not always exactly) in forward foreign exchange rates expressing USD appreciation
- Leads to extensive USD borrowing
 - **Original sin:** borrowing in foreign currency due to inability to borrow locally or abroad in domestic currency
- Higher interest rates in EMDE → hedging generally costly
 - Sell currency positions forward at rates reflecting USD appreciation
 - Borrow USD at rates reflecting basis

Risk and uncovered parity in emerging markets

- Lending in emerging markets funded in major currency → long uncovered emerging markets currency position against USD
- Higher emerging-markets interest rates often the motivation for currency carry traded
- Similar to lending in emerging markets, but shorter-term and via simple market instruments
 - Carry trade essentially an unhedged short-term loan in local currency
 - Provides straightforward illustration of risks in lending abroad by USD-based investors without currency hedge
- Emerging market interest rate differentials can be quite wide, but more reliably associated with eventual depreciation
 - Eventually, if not in the full measure of the interest rate differentials
 - And highly uncertain timing, even when volatility is high

Impact on foreign exchange derivatives market

- **Cross-currency basis:** difference between borrowing a currency in local deposit markets and through FX forwards
- **Cross-currency basis swaps (CCBS):** exchange of payments based on money-market indexes in two different currencies
- Basis indicates imbalance between supply and demand for funding in one currency relative to other
- A negative basis vis-à-vis USD means
 - Forward exchange rate indicates sharper depreciation of USD than interest-rate differentials
 - But higher cost of funding in USD: need more USD to repay foreign money market borrowing
- The τ -year basis for a currency pair can be calculated from its deposit and exchange rates and covered interest parity condition

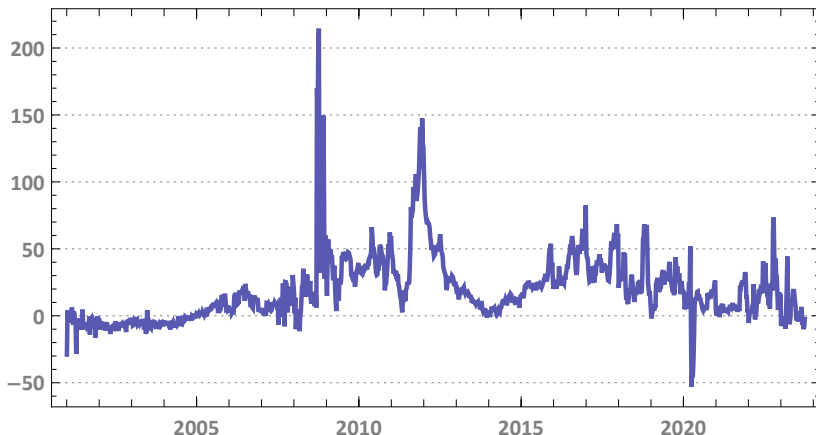
$$1 + r_{t,\tau} - \left(\frac{F_{t,\tau}}{S_t} \right)^{\frac{1}{\tau}} (1 + r_{t,\tau}^*)$$

using approximation $1 + \tau r \approx (1 + r)^\tau$

Cross-currency basis since the crisis

- USD-EUR congenially negative since global financial crisis: pay extra for USD Libor funding
 - Recent widening of basis particularly pronounced for major crosses against USD
- Could be readily arbitrated away, but needs a lot of balance sheet
 - Can be done via local branch offices or via forward foreign exchange markets
 - Capital constraints on large banks→limits to arbitrage and impaired market functioning
- A negative basis boosts returns on USD-based investments in foreign-denominated assets
- But also boosts USD borrowing costs, lowers USD returns for foreign-domiciled market participants
- Basis generally makes USD funding more expensive for emerging-markets borrowers

Failure of covered interest parity 2001–2023



Spread in basis points between cost of 3-month U.S. dollar funding directly via FX swaps and via Libor, weekly, 02Jan2001 to 02Oct2023. A *positive* spread indicates Libor funding is cheaper and corresponds to a *negative* cross-currency basis swap spread. *Data source:* Bloomberg LP.

Dollar dominance, financial development and covered parity

- Non-U.S. intermediaries' USD borrowing cost higher
 - European banks seek USD funding via FX swaps: borrow €, CHF, and £, swap into USD
 - But at higher rates than directly via interbank market
 - \Leftrightarrow FX premium $F_{t,\tau} - S_t$ too high given $r_{t,\tau}$ and $r_{t,\tau}^*$
- EMDE borrowers face dual problem:
 - Original sin obliges borrowing in USD
 - Lack of USD deposit base \rightarrow higher borrowing cost
- Cannot be avoided via currency swaps: higher borrowing cost impounded in swap rates

Features of currency crises

- A currency crisis manifests at least one of these phenomena
 - Large nominal foreign exchange depreciation
 - Rapid increase and high level of exchange rate volatility
 - **Devaluation**: abandonment of a fixed exchange rate level or system
 - Large and rapid loss of foreign exchange reserves as central bank endeavors to avert devaluation
- Central bank efforts to avert devaluation/depreciation may lead to
 - Large increase in level and volatility of local interest rates
 - Large and rapid loss of foreign exchange reserves
- Often apparently result of **speculative attack**
 - Fixed exchange rates may create “one-way bet”: material probability of sharp depreciation of local currency but very low probability of appreciation
 - Hard to identify: massive selling of local currency apparently not motivated by ordinary commercial needs

Causes and consequences of currency crises

- Currency crises generally associated with other major financial and economic disturbances
 - Causality often unclear
- **Twin crises:** typical coincidence of banking and currency crises in emerging markets
- Currency and external debt crises often coincide
 - **Original sin:** extensive foreign-currency funding of local banks or firms in absence of developed local capital markets
 - Often short-term
 - Results in reliance on continued capital flows
 - ⇒ Vulnerability to **sudden stops:** abrupt drop in capital inflows, cessation of external funding
 - Similar to liquidity risk of financial intermediary reliant on repo or deposit funding
- Combination of currency peg and persistent inflation leads to capital outflows

Recent currency crises

European Monetary System (ERM) crisis (1992–93)

- Withdrawal and/or devaluation of weaker currencies
- Followed by abandonment of narrow fluctuation limits for the others

Mexican peso (“Tequila”) crisis (1994–95)

- Boom followed by reversal of capital inflows and devaluation
- Ended by large-scale international bailout

Asian crisis (1997–98)

- Sequence of devaluations, beginning with Thai baht in July 1997

Russian default crisis (1998): devaluation accompanied by

- Default on both domestic and external public debt, suspension of foreign payments by banks

Turkish currency crisis (2001): abandonment of currency peg

Icelandic financial crisis (2008): sharp depreciation and imposition of capital controls

- Follows collapse of banking system heavily dependent on foreign depositors

Interest rates and currency crises

- Typically, local interest rates rise in response to depreciation, FX volatility
 - But very situation-dependent
- Some factors drive interest rates higher
 - Depreciation may excite expectations of further depreciation→impact on forward rates
- Other factors restrain interest rates
 - Depreciation may be rapid enough to obviate need—and expectation of—higher interest rates
 - Policy makers may be resistant to interest-rate increases
- Interest rates rise more in response to than in advance of depreciation during crises and stress events

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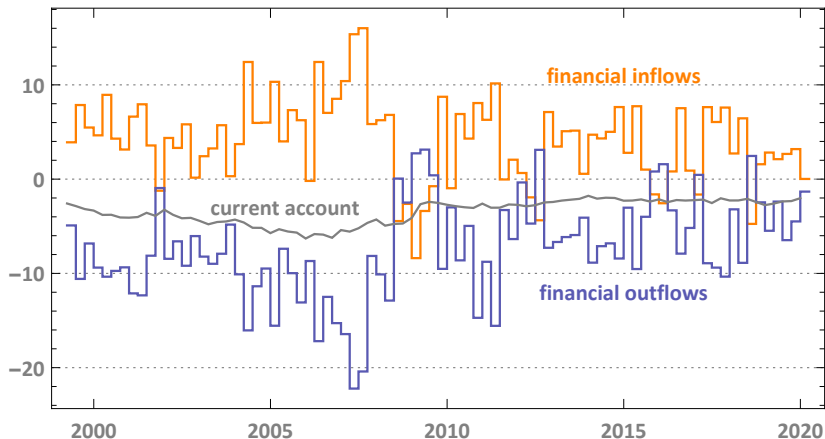
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U.S. balance of payments and financial stability

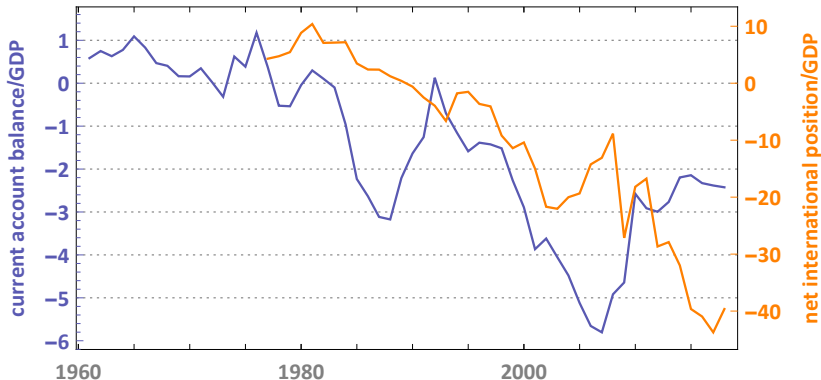
- Persistent U.S. current account deficits
- Composition of U.S. NIIP:
 - **Liabilities:** short- and long-term debt denominated in USD, incl. Treasurys
 - **Assets:** longer-term investments, foreign direct investment, largely foreign-currency denominated
- Debate on causes and consequences of persistent current account deficits and large negative NIIP
- Debate on contribution of international imbalances to financial crisis of 2008
- Current account and financial account balances: which causes which?
- Explanations view U.S. as intermediary
- Current issues: safe assets and intermediation in USD
 - Are they sustainable over time
 - Do they cause harm?

U.S. financial flows and current account 1989–2018



Net acquisition of financial assets, incurrence of liabilities and current account balance, expressed as ratio to current-dollar U.S. GDP in percent, quarterly, Q4 1989 to Q2 2018. *Source:* U.S. Bureau of Economic Analysis, U.S. International Transactions, Table 1.1. and National Income and Product Accounts, Table 1.1.5.

U.S. current account and net investment position



U.S. balance on current account, NIPAs [A124RC1A027NBEA], net international investment position [IIPUSNETIA], expressed as ratio to current-dollar U.S. GDP [GDPA] in percent, annual, end of period, 1960 to 2017. *Source:* U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis.

“Dark matter”: the U.S. investment income puzzle

- U.S. current account deficits from 1960s on
- →negative NIIP, U.S. a net debtor from 1980s on:
 - Foreign-owned U.S. assets (U.S. liabilities) exceed U.S.-owned foreign assets (foreign liabilities)
 - Comprises public and private debt issues, direct portfolio equity investment
 - Net position is large, ≈ 40 percent of U.S. GDP
- But U.S. has a surplus of net international investment income of ≈ 1 percent of GDP
- “Dark matter” puzzle: where does the difference arise?
 - Low-yield U.S. Treasury debt a large fraction of U.S. liabilities
 - U.S.-owned foreign assets more heavily weighted to higher-return equity foreign-owned U.S. assets
- Equity return differential possibly artifact of U.S. multinational tax arbitrage
 - Income reported in low-tax jurisdictions

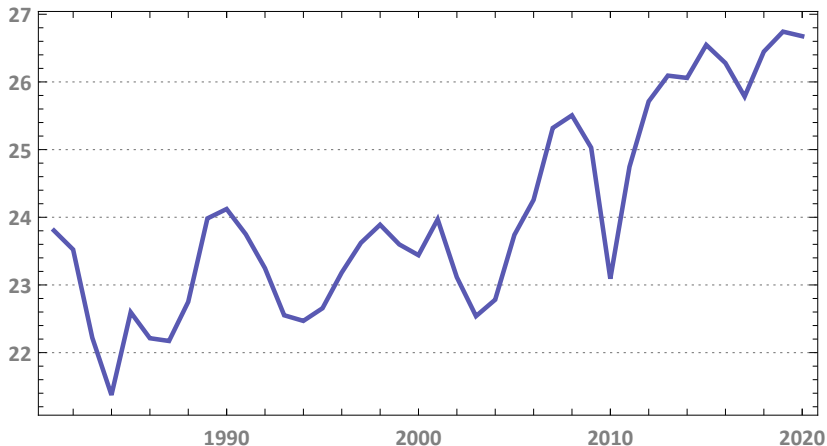
The global savings glut hypothesis

- Net savings and government deficits viewed as driver
- Current account imbalances due to increase in saving in emerging market countries and oil producers
- Underlying causes
 - Rising income, ability to save without privation
 - Demographic: longer-lived and aging population
 - Underdeveloped financial markets and rule of law in some countries with high savings rates
- Large increase in savings volume
 - Both savings rate and income rise
 - Includes accumulation of foreign reserves
 - Increase in savings exceeds local investment opportunities
- Investors seek safe, predominantly U.S. assets

Excess savings and the safe asset shortage

- Supply of safe assets said lagging behind vast demand as world wealth grows
- Demand primarily for advanced-economy government bonds, dollar-denominated assets, esp. U.S. Treasurys
- Depresses world “risk-free” interest rates
- “New Triffin dilemma:” supplying safe assets erodes U.S. fiscal solvency
 - Enables U.S. federal budget deficit financing in short run
 - Contributes to longer-term U.S. federal budget vulnerability to higher interest rates
- Contributes to large gross and net international capital flows and imbalances

World savings rate 1980–2019



World gross national savings, percent of GDP. *Source:* International Monetary Fund, World Economic Outlook, October 2020 database and Table A14: Summary of Net Lending and Borrowing).

The new mercantilism

- Mercantilist exchange rate management by developing countries
 - Weak local currency and reserve accumulation as development policies
 - Current account imbalances a mechanism to attract foreign direct investment and associated technical knowledge
- **Bretton Woods II:** stable system in which U.S. deficits financed by developing countries
 - High-growth exporting regions e.g. China in place of 1950s Europe
 - Exporting regions accumulate reserves, U.S. supplies liquidity
 - Alternative interpretation of Bretton Woods II surpluses
 - Foreign reserves accumulated as a result of surpluses serve as collateral in presence of legal risk
 - ⇒ Reverse of standard interpretation of high reserves as empowering developing surplus countries

Global financial cycle

- Correlation of international financial flows and financial conditions
- Procyclicality: increases in gross capital flows coincide with
 - Growth in credit extension, leverage, rising asset prices, risk appetite
 - Growth in credit→unsustainable expansion culminating in crisis
- Deficit countries finance more readily when conditions loose
- Greater tolerance of currency mismatch by non-U.S. intermediaries
- Instability on global level mirrors instability at regional level
 - Growth in credit→unsustainable expansion culminating in crisis
- **Dollar cycle:** U.S. interest rates drive world interest rates
 - U.S. interest rates drive world interest rates
- Expansionary bias in U.S. monetary policy
 - →expansionary bias in international financial system via role of U.S. dollar in global intermediation
 - Potential misalignment with local macroeconomic conditions
- Rise in gross cross-border flows signals and acts as transmission mechanism for excessively expansionary U.S. monetary stance

The impossible trinity

- **Impossible trinity** or **Mundellian trilemma**: country cannot have
 - Flexible exchange rate
 - Autonomous monetary policy
 - Free international movement of capital
- → Must accept *either* local-currency ap-/depreciation *or* excessively tight/accomodative monetary policy *or* capital controls
- Financial imbalances may reduce a trilemma to a dilemma
 - Exchange rate swings insufficient to compensate for changes in financial conditions
 - USD appreciation and high USD interest rates cause vulnerabilities
 - Rapid depreciation may not avert vulnerability to rising USD rates
 - Reverses expansion under accommodative U.S. monetary policy
- Why? Conflicting impact of exchange-rate movements outside U.S.
 - USD appreciation increases net exports → positive macroeconomic and financial effects
 - But USD appreciation → financial weakening of domestic firms borrowing in USD and their lenders
- **Fixed exchange rates** pegged to USD or **fear of floating** in many countries