

Lecture notes on risk management, public policy, and the financial system

International financial imbalances

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Overview of international imbalances

Characteristics of international imbalance

U.S. dollar and international imbalances

Causes of international imbalance

Crises and dysfunction in foreign exchange markets

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International financial imbalances and stability

The role of the current account in international imbalances

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Current account imbalances

Rising global debt

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

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Global savings glut

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The global financial cycle

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Currency crises

Arbitrage failure in global money markets

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

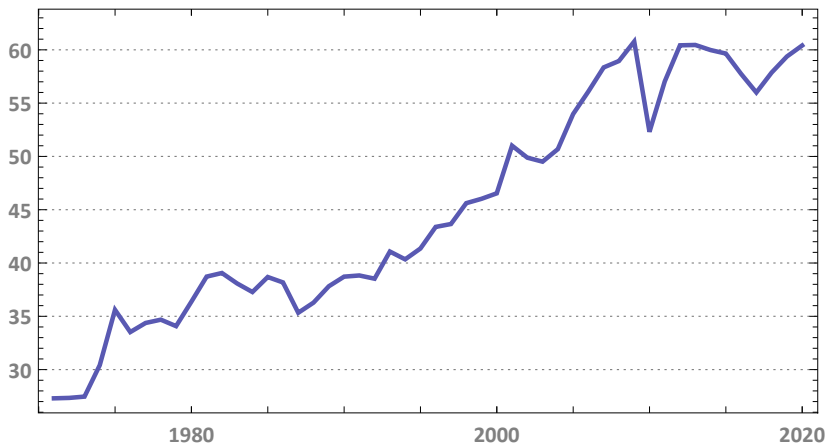
- Analytical points of view

Macroeconomic: saving, investment, growth

Financial: balance sheets, credit expansion and risk taking

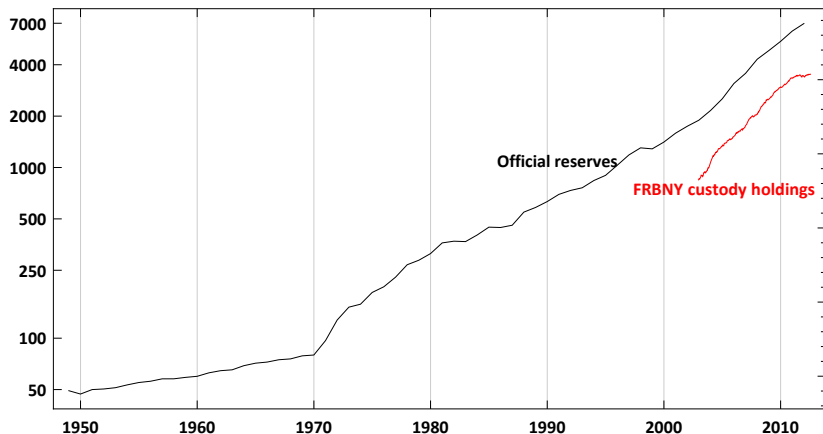
- International financial markets can transmit/amplify financial shocks
 - Through international transactions and capital flows and through valuation of foreign assets
 - Amplification of banks' leveraging and deleveraging
 - Transmission of monetary policy

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.

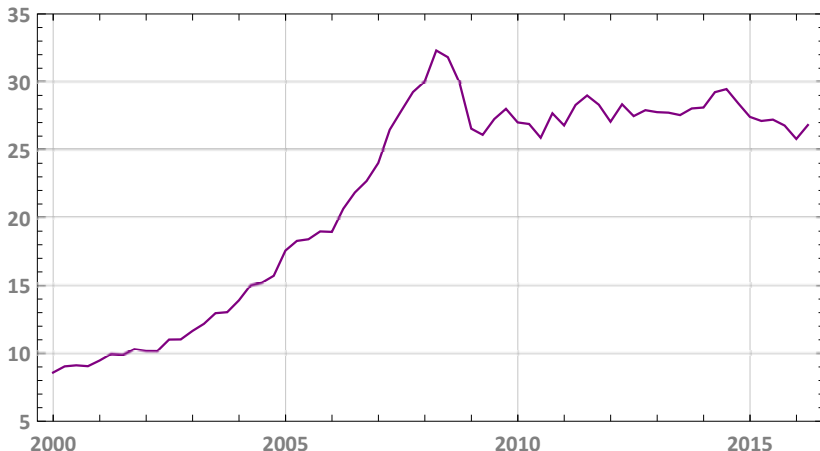
Economic globalization

- 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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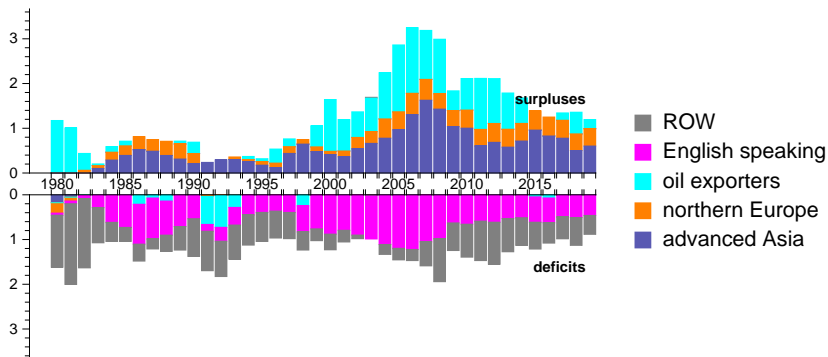
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Prevalence of current account imbalances

- 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, Norway, 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

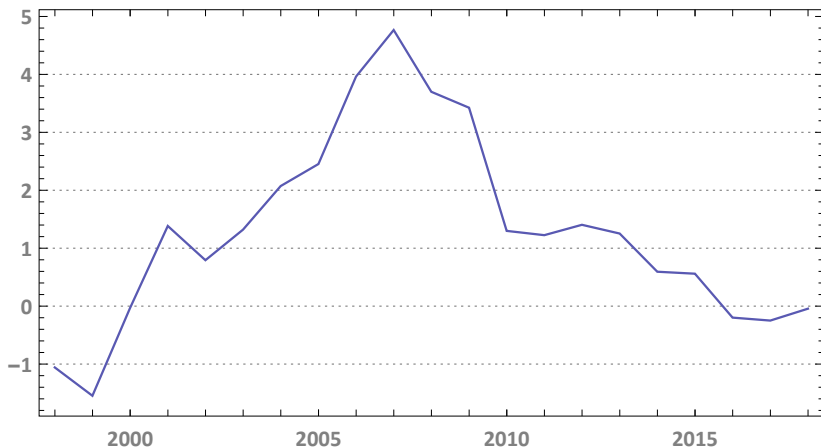
Asymmetry between surplus and deficit regions

- 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

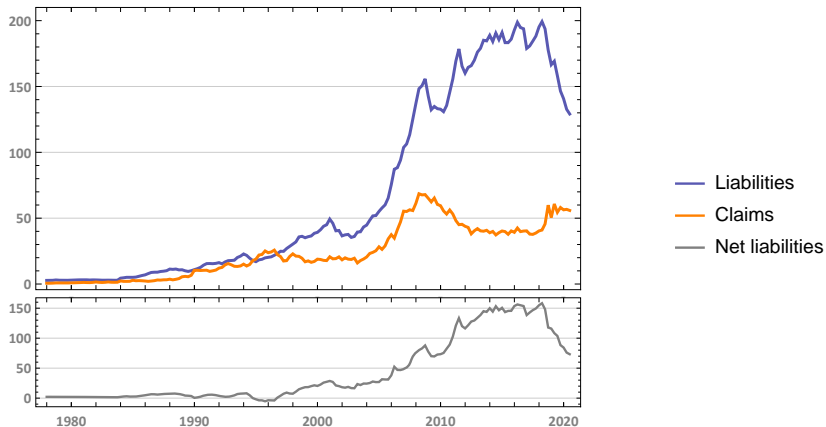
- Historical norm: investment by advanced economies drives financial account surpluses in developing economies
 - Corresponding to current account deficits (surpluses) in developing (advanced) economies
- Contrary pattern in recent decades: **Lucas paradox** of “uphill capital flows”
 - Current account 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).

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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

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

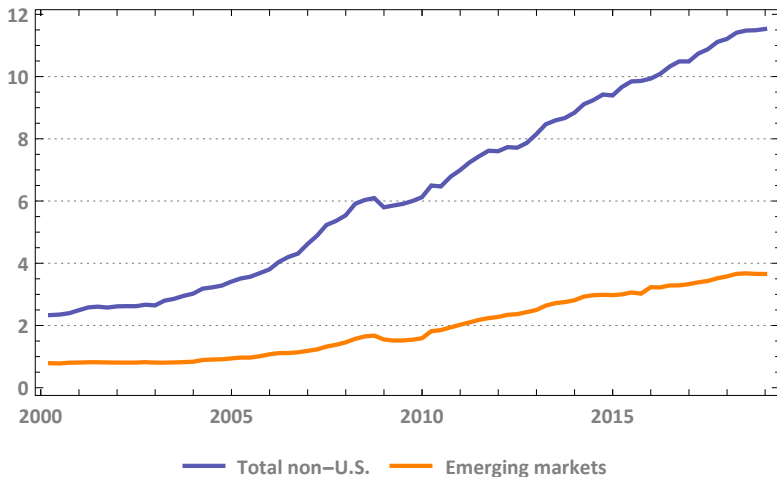
U.S. dollar in international banking

- 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
 - 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

Managing U.S. dollar risks

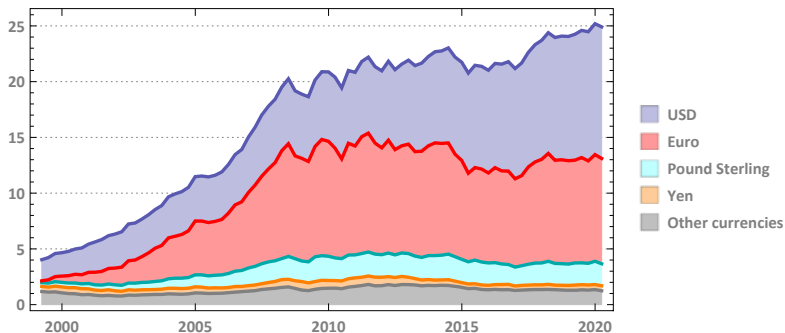
- Non-U.S., esp. European, Japanese banks, run large matched USD books
 - Non-U.S. banks' USD liabilities and assets are *currency*, but not *maturity* matched
- Non-U.S. entities have exposure to two inter-related risks
 - Funding risk:** commercial paper rollover, deposit withdrawals
 - Dependence 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 2000–2018



US dollar-denominated credit—bank loans and debt securities—to non-bank borrowers outside the United States, amounts outstanding, \$trill., quarterly, Q1 2000 to Q4 2018. *Source:* BIS global liquidity indicators, Table E2-USD.

International debt securities 1999–2020



Outstanding stock of international debt securities issued outside the local market of the country where the borrower resides, by currency of denomination, \$trill., quarterly, Q1 1999 to Q1 2020. *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

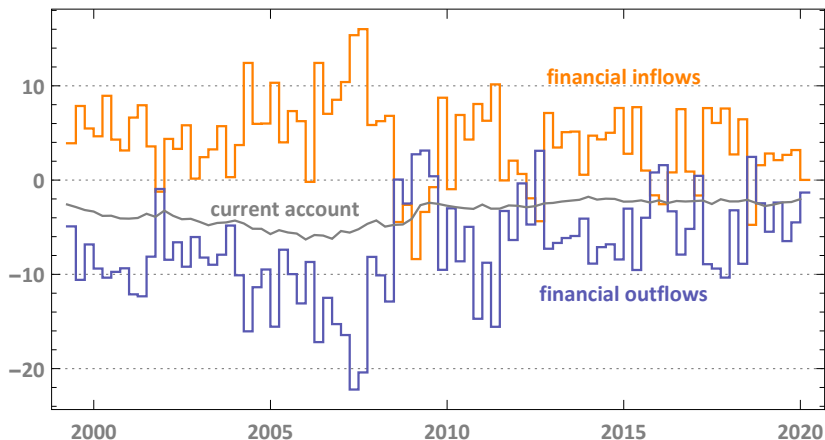
Federal Reserve as world's central bank

- 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

U.S. balance of payments and financial stability

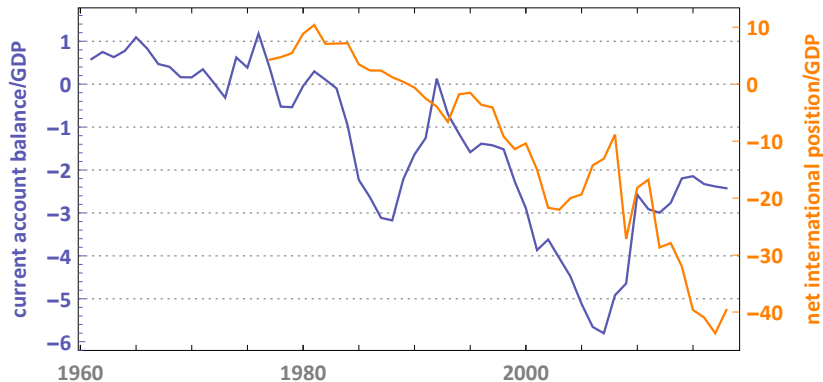
- Persistent U.S. current account deficits
- Composition of U.S. NIIP:
 - **Liabilities:** short- and long-term debt denominated in USD, incl. Treasurys
 - **Assets:** longer-term investments, foreign direct investment, largely foreign-currency denominated
- Debate on causes and consequences of persistent 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

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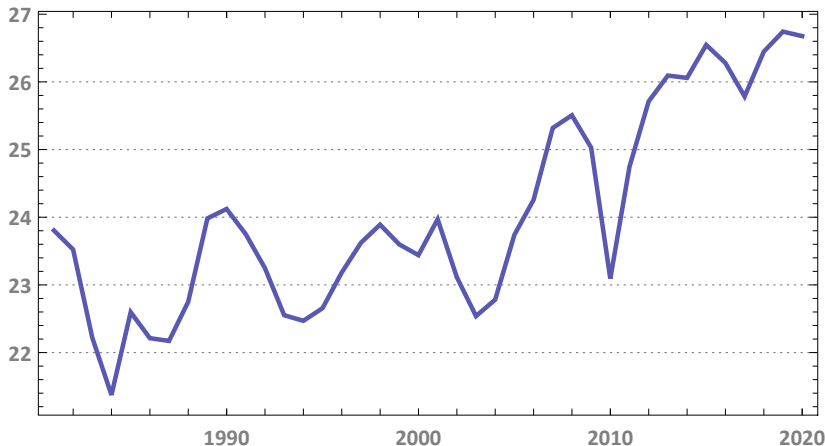
The global savings glut hypothesis

- 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

U.S. as intermediary

- U.S. as “world venture capitalist”: issues short-term USD liabilities, acquires foreign direct investments

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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

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
 - European banks seek USD funding via FX swaps: borrow €, CHF, and £, swap into USD
 - But at higher rates than directly via interbank market
 - ⇔ FX premium $F_{t,\tau} - S_t$ too high given $r_{t,\tau}$ and $r_{t,\tau}^*$

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

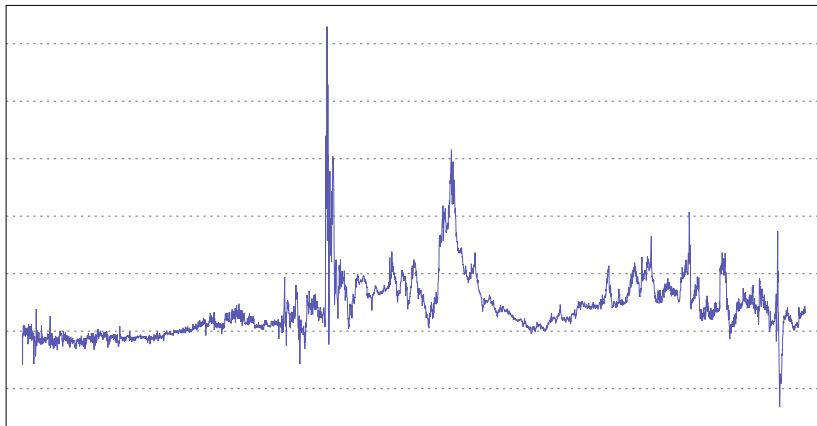
$$1 + r_{t,\tau} - \left(\frac{F_{t,\tau}}{S_t} \right)^{\frac{1}{\tau}} (1 + r_{t,\tau}^*)$$

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 2006–2018



Spread in basis points between cost of 3-month U.S. dollar funding directly via FX swaps and via Libor, daily, 02Jan2006 to 01Nov2018. A *positive* spread indicates Libor funding is cheaper and corresponds to a *negative* cross-currency basis swap spread.

Data source: Bloomberg LP.