DegreeLive

Bachelor of Commerce (B2001) | Level 3 • Part B Major | Monash University

International finance

Course Code: BFC3240 • Module 1 Notes

Module 1: The International Monetary System, Balance of Payments & Parity Conditions

Chapter 1: Evolution of the International Monetary Architecture

1.1 The Classical Gold Standard (1876–1914) & The Price-Specie-Flow Mechanism

The architecture of international finance has evolved through successive institutional regimes designed to facilitate cross-border trade, capital allocation, and foreign exchange settlement. Under the Classical Gold Standard (1876–1914), participating nations committed to convert domestic paper currency into physical gold at a fixed statutory parity price upon demand, while allowing unrestricted international gold flows. Because each national currency had a fixed gold content, exchange rates between participating currencies were rigidly fixed within narrow boundaries known as the "gold points" (the parity rate plus or minus the physical cost of shipping and insuring gold across borders).

The macroeconomic equilibrium of the classical gold standard was anchored by the classical **Price-Specie-Flow Mechanism** formulated by David Hume (1752). Under this automatic adjustment mechanism, external balance-of-payments disequilibria were self-correcting:

1. Suppose Country A experienced a persistent trade deficit, importing more merchandise than it exported. The excess demand for foreign currency caused net gold exports (specie outflows) from Country A to surplus Country B.
2. Under the quantity theory of money ($MV = PY$), the physical outflow of gold directly contracted the domestic money supply ($M \downarrow$) in Country A, while expanding the money supply ($M \uparrow$) in surplus Country B.
3. Assuming real output (Y) and transaction velocity (V) were relatively stable in the medium term, domestic price levels fell in Country A ($P \downarrow$) and rose in Country B ($P \uparrow$).
4. Lower relative domestic prices made Country A's export goods commercially competitive internationally, while making imports from Country B prohibitively expensive. Consequently, Country A's exports expanded, imports contracted, and external trade balance was restored without central bank policy intervention.

While the gold standard provided remarkable price stability and eliminated exchange rate uncertainty, its fatal flaw was complete subjugation of domestic monetary policy to external gold supplies. Discovery of new gold deposits caused international inflation, while gold scarcity triggered domestic economic recessions, banking panics, and debt-deflation spirals.

1.2 The Interwar Instability & The Bretton Woods System (1944–1971)

The outbreak of World War I collapsed the Classical Gold Standard as governments suspended gold convertibility to print fiat currency to finance military operations. The interwar period (1918–1939) was characterised by hyperinflation (e.g. the German Weimar Republic), competitive currency devaluations ("beggar-thy-neighbour" trade policies), autarkic tariff barriers (the US Smoot-Hawley Tariff Act), and systemic trade fragmentation during the Great Depression.

In July 1944, delegates from 44 Allied nations convened at Bretton Woods, New Hampshire, to design a resilient postwar international monetary architecture. The Bretton Woods Agreement established an **adjustable peg gold-exchange standard** anchored by two new multilateral institutions: the International Monetary Fund (IMF), established to oversee exchange rate stability and provide short-term balance-of-payments financing; and the International Bank for Reconstruction and Development (the World Bank), designed to finance postwar reconstruction and economic development.

Under the Bretton Woods framework:

- The United States dollar was established as the sole anchor currency, pegged to physical gold at the fixed statutory price of US$35 per troy ounce of fine gold. The US Federal Reserve guaranteed unrestricted convertibility of US dollars into gold for foreign central banks.
- All other participating currencies pegged their official exchange rate to the US dollar within an allowable fluctuation band of $\pm 1.0\%$. Central banks maintained this band by buying or selling US dollar reserves in foreign exchange markets.
- Nations could alter their par value only in cases of "fundamental disequilibrium", subject to formal consultation and approval by the IMF, preventing competitive devaluations.

1.3 Triffin Dilemma and the Transition to Floating Exchange Rates

The structural vulnerability of the Bretton Woods system was articulated by Belgian-American economist Robert Triffin in 1960, known as the **Triffin Dilemma**. For global trade and financial liquidity to expand, the world required a continuous expansion of US dollar reserves. However, the United States could only supply these reserves by running continuous, growing balance-of-payments deficits.

degreelive

Over time, cumulative foreign dollar holdings held by foreign central banks inevitably exceeded the physical US gold stock stored at Fort Knox. As foreign dollar claims multiplied while US gold reserves diminished, market confidence in the ultimate gold convertibility of the dollar eroded, making a catastrophic run on US gold reserves mathematically certain.

By 1971, massive US fiscal spending on the Vietnam War and Great Society domestic programs accelerated US inflation, generating massive capital flight from the dollar into German Deutsche marks and Swiss francs. On 15 August 1971, President Richard Nixon unilaterally announced the suspension of the gold convertibility of the US dollar—closing the "gold window" and dissolving the Bretton Woods system. Following unsuccessful attempts to re-establish fixed pegs under the Smithsonian Agreement, major global currencies transitioned to floating exchange rate regimes in March 1973, codified internationally in the 1976 Jamaica Accords.

1.4 Modern Exchange Rate Regimes: The Impossible Trinity (Policy Trilemma)

Modern economies adopt diverse exchange rate arrangements, ranging from hard fixed pegs to clean independent floats. A nation's choice of exchange rate regime is fundamentally constrained by the **Mundell-Fleming Impossible Trinity (Policy Trilemma)**, which asserts that an open economy cannot simultaneously maintain all three of the following policy objectives:

> $$\text{Impossible Trinity} = \{\text{Fixed Exchange Rate}, \text{Free Capital Mobility}, \text{Independent Monetary Policy}\}$$

A government or central bank can choose any two attributes, but must forfeit the third:

- **Option 1 (The Australian / US / UK Model):** Free Capital Mobility + Independent Monetary Policy $\implies$ *Must adopt a Floating Exchange Rate*. The Reserve Bank of Australia (RBA) sets the official cash rate to target domestic inflation (2% to 3%) and maintain domestic full employment, allowing the Australian dollar (AUD) to float freely in foreign exchange markets to absorb terms-of-trade shocks.
- **Option 2 (The Hong Kong / Currency Board Model):** Fixed Exchange Rate + Free Capital Mobility $\implies$ *Must forfeit Independent Monetary Policy*. The Hong Kong Monetary Authority (HKMA) pegs the Hong Kong dollar strictly at HK$7.75–7.85 per US dollar. Because capital moves freely, Hong Kong interest rates must mirror US Federal Reserve interest rates exactly, regardless of domestic economic conditions.
- **Option 3 (The Historical Bretton Woods / Early Chinese Model):** Fixed Exchange Rate + Independent Monetary Policy $\implies$ *Must impose Capital Controls*. The central bank fixes the exchange rate and sets domestic interest rates, but must restrict private capital flight through capital controls and administrative quotas.

Exchange Rate Regime	Operational Mechanism	Key Advantages	Key Vulnerabilities	Representative Economies
Hard Peg: Dollarization / Monetary Union	Adoption of another country's currency or creation of a shared single currency.	Completely eliminates exchange rate volatility and currency transaction costs; strong anti-inflation credibility.	Complete loss of domestic monetary policy independence and national seigniorage; no lender of last resort.	Eurozone (19 nations), Ecuador, Panama, El Salvador.
Hard Peg: Currency Board	Legislated fixed peg where domestic currency base is 100% backed by foreign reserve assets.	High institutional credibility; anchors inflation expectations; eliminates currency depreciation risk.	Domestic money supply strictly tied to foreign reserves; severe domestic deflation if reserves fall.	Hong Kong (HKMA), Bulgaria.
Soft Peg: Conventional Fixed Peg	Pegged to a single currency or basket within narrow bands ($\pm 1.0\%$); maintained via central bank intervention.	Reduces transaction uncertainty for importers and exporters; provides intermediate nominal anchor.	Vulnerable to speculative attacks when reserves deplete; misaligned real exchange rates cause trade distortions.	Saudi Arabia (pegged to USD), United Arab Emirates.
Managed Float ("Dirty Float")	Exchange rate fluctuates based on market supply and demand, but central bank intervenes to dampen excessive volatility.	Provides shock absorption while dampening disorderly speculative swings.	Lack of policy transparency; central bank reserve depletion if intervening against fundamental trends.	India, Singapore (MAS band framework), Switzerland.
Free Float ("Clean Float")	Exchange rate determined purely by market forces with zero routine central bank market intervention.	Preserves complete monetary policy autonomy; operates as automatic shock absorber for terms-of-trade shifts.	Exposes domestic firms to substantial currency volatility and speculative bubbles.	Australia (since Dec 1983), United States, Japan, Canada.

Degreelive

Chapter 2: The Balance of Payments Accounting Framework

2.1 Structural Accounts within the Balance of Payments (BOP)

The Balance of Payments (BOP) is a systematic double-entry statistical record of all economic transactions conducted between the residents of an economy and the rest of the world over a specified period, compiled in Australia by the Australian Bureau of Statistics (ABS) in accordance with IMF BPM6 standards. The BOP comprises three core accounts:

1. **The Current Account (CAB):** Measures cross-border transactions involving newly produced goods, services, and primary and secondary income flows:
   - *Balance on Goods and Services (Trade Balance, $BOGS$):* The net value of exported physical merchandise (Australian iron ore, metallurgical coal, LNG, agricultural wheat) and services (international education, inbound tourism) minus imported goods (machinery, vehicles, electronics) and services (freight shipping, outbound tourism).
   - *Net Primary Income (NPI):* Measures cross-border compensation of employees and investment income flows—specifically dividends, interest payments, and profits paid to foreign investors on Australian assets minus investment returns received by Australian residents on offshore assets. Because Australia has historically been a persistent net foreign debtor, the NPI balance has historically exhibited a persistent structural deficit.
   - *Net Secondary Income:* Unilateral transfers that have no economic quid pro quo, including foreign aid payments, international remittances, and pensions.
2. **The Capital Account:** Comprises non-financial, non-produced asset transfers (such as cross-border purchases of brand trademarks, patents, mining exploration rights, and telecommunications spectrum licenses) alongside capital debt forgiveness and immigrant capital transfers. For Australia, the Capital Account is quantitatively minor.
3. **The Financial Account:** Records transactions involving financial assets and liabilities—the net capital flows that finance the current account deficit or absorb a current account surplus:
   - *Foreign Direct Investment (FDI):* Cross-border equity investment involving an ownership stake of 10.0% or more, giving the investor lasting commercial interest and significant managerial control (e.g. an overseas multinational acquiring an Australian mining company or expanding a local manufacturing facility).
   - *Portfolio Investment:* Cross-border purchases of equity shares (less than 10% ownership) or debt securities (government bonds, corporate debentures) undertaken for financial return rather than managerial operational control.
   - *Financial Derivatives:* Value of cash settlements on derivative contracts (forwards, swaps, options).
   - *Other Investment:* Cross-border bank deposits, trade credit facilities, and loans.
   - *Reserve Assets:* Official foreign exchange assets and gold held and managed by the Reserve Bank of Australia (RBA).

2.2 The Fundamental Balance of Payments Identity

Because every international transaction involves a double-entry debit and credit, the overall balance of payments must mathematically sum to zero in accounting terms:

$$\text{Current Account (CAB)} + \text{Capital Account (KA)} + \text{Financial Account (FA)} + \text{Net Errors and Omissions (NEO)} = 0$$

Assuming the Capital Account and Net Errors and Omissions are negligible, the fundamental identity simplifies to:

$$\text{CAB} + \text{FA} = 0 \quad \Longrightarrow \quad \text{CAB} = -\text{FA}$$

This identity establishes that an economy running a Current Account Deficit ($\text{CAB} < 0$) must run a corresponding Financial Account Surplus ($\text{FA} > 0$), importing foreign capital to finance the shortfall. Conversely, an economy with a Current Account Surplus ($\text{CAB} > 0$) must run a Financial Account Deficit ($\text{FA} < 0$), exporting domestic capital by acquiring offshore assets.

2.3 Macroeconomic National Income Linkages: The Twin Deficits Hypothesis

The Current Account balance is intrinsically linked to domestic macroeconomic saving and investment decisions through the national income accounting identity. Aggregate national expenditure and income is represented by:

$$Y = C + I + G + (X - M)$$

DegreeLive

Gross National Disposable Income ($GNDI$) incorporates net foreign income (NPI):

$$GNDI = C + I + G + (X - M + NPI) = C + I + G + \text{CAB}$$

Because National Saving (S) equals total national income minus private and public consumption:

$$S = GNDI - C - G = (C + I + G + \text{CAB}) - C - G = I + \text{CAB}$$

Rearranging yields the foundational macroeconomic saving-investment balance:

$$\text{CAB} = S - I$$

Further decomposing national saving into Private Saving ($S_{\text{private}} = Y - T - C$) and Public Government Saving ($S_{\text{public}} = T - G$):

$$\text{CAB} = (S_{\text{private}} - I) + (T - G)$$

Where:

- $S_{\text{private}} - I$ represents the net private sector financial surplus or deficit.
- $T - G$ represents the government fiscal balance (where $T > G$ is a budget surplus, and $T < G$ is a budget deficit).

Under the **Twin Deficits Hypothesis**, holding private saving and investment constant ($S_{\text{private}} - I$), an increase in the government budget deficit ($T - G < 0$) causes an equivalent deterioration in the Current Account balance. When the public sector expands borrowing without a commensurate rise in domestic private saving, the gap must be funded by borrowing from international capital markets, driving the current account into deficit.

Chapter 3: The Foreign Exchange Market Architecture & Mechanics

3.1 Market Structure, Participants & Turnover Dimensions

The foreign exchange (FX) market is the largest, most liquid financial market in the global economy. According to the Bank for International Settlements (BIS) Triennial Central Bank Survey, global daily OTC foreign exchange turnover exceeds US$7.5 trillion. The market operates 24 hours a day, five business days a week, continuously following global sun paths from Sydney and Tokyo to London and New York.

Key participants in the FX market include:

- **Tier-1 Market-Making Commercial Banks:** Major international banks (e.g. JPMorgan Chase, Citi, Deutsche Bank, UBS, alongside Australia's Big Four: ANZ, CBA, NAB, Westpac) who quote continuous two-way bid and ask prices to customers and trade amongst themselves on electronic interbank broker platforms (EBS, Refinitiv FXall).
- **Multinational Corporations (MNCs):** Sourcing inputs, exporting finished goods, hedging balance sheet exposures, and executing cross-border foreign direct investments.
- **Institutional Investors & Asset Managers:** Superannuation funds (such as Australia's retirement savings pool), sovereign wealth funds (Australia's Future Fund), mutual funds, and hedge funds investing in international sovereign bonds and equity markets.
- **Central Banks:** Managing official foreign exchange reserves, monitoring monetary stability, and occasionally intervening to stabilize disorderly market conditions.

3.2 Quotation Conventions: Direct, Indirect & Cross Rates

Foreign exchange rates represent the price of one currency expressed in units of another currency. In every FX quote, the first currency is the **Base Currency**, and the second currency is the **Terms (Quote) Currency**:

DegreeLive

$$\text{Exchange Rate} = \frac{\text{Terms Currency}}{\text{Base Currency}} \quad (\text{e.g. AUD/USD } 0.6500 \implies 1 \text{ AUD} = 0.6500 \text{ USD})$$

Standard market quotation conventions include:

- **Direct Quotation:** The price of one unit of foreign currency expressed in variable units of domestic currency (e.g. for an Australian resident, quoting USD/AUD = AUD 1.5385 per 1 USD).
- **Indirect Quotation:** The price of one unit of domestic currency expressed in variable units of foreign currency (e.g. for Australia, quoting AUD/USD = 0.6500 USD per 1 AUD). In global foreign exchange trading, the Australian dollar (AUD), New Zealand dollar (NZD), British pound (GBP), and Euro (EUR) are conventionally quoted on an indirect basis against the US dollar.
- **Bid-Ask Spreads:** Market-makers quote two prices simultaneously:

  $$\text{Quotation} = \text{Bid} - \text{Ask}$$

  Where the **Bid Price** is the price at which the dealer will buy the base currency, and the **Ask (Offer) Price** is the price at which the dealer will sell the base currency. The dealer buys low and sells high; the difference represents the dealer's transaction compensation:

  $$\text{Percentage Spread} = \frac{\text{Ask} - \text{Bid}}{\text{Ask}} \times 100\%$$

- **Cross Rates:** An exchange rate between two currencies neither of which is the US dollar (e.g. AUD/JPY, EUR/GBP). Cross rates are derived mathematically from each currency's respective US dollar quote. For example, given indirect quotes $\text{AUD/USD} = S_1$ and $\text{USD/JPY} = S_2$:

  $$\text{AUD/JPY} = \text{AUD/USD} \times \text{USD/JPY} = S_1 \times S_2$$

Chapter 4: International Parity Conditions

4.1 Covered Interest Parity (CIP) & Arbitrage Mechanics

Covered Interest Parity (CIP) is the foundational non-arbitrage condition in international finance. It links spot exchange rates, forward exchange rates, and nominal interest rate differentials across national money markets. CIP states that the return on a hedged foreign money market investment must exactly equal the return on an equivalent domestic money market investment of identical maturity and credit risk.

Let:

- S: Current spot exchange rate quoted as foreign currency per unit of domestic currency (e.g. USD per 1 AUD).
- F: Forward exchange rate for delivery at maturity T quoted as foreign currency per 1 AUD.
- r_{AUD}: Domestic Australian annual interest rate.
- r_{USD}: Foreign US annual interest rate.

An Australian investor with 1 AUD can pursue two alternative riskless strategies over one period:

1. **Domestic Strategy:** Invest 1 AUD in the Australian money market to receive $(1 + r_{\text{AUD}})$ at maturity.
2. **Covered Foreign Strategy:** Convert 1 AUD into foreign currency at spot rate S, receiving S USD; invest the USD in the US money market to accumulate $S(1 + r_{\text{USD}})$ USD at maturity; and simultaneously sell the future USD proceeds forward at the contractual forward rate F, locking in $\frac{S(1+r_{\text{USD}})}{F}$ AUD at maturity.

In the absence of arbitrage opportunities, the two strategies must yield identical payoffs:

Degree Live

$$1 + r_{\text{AUD}} = \frac{S(1 + r_{\text{USD}})}{F}$$

Rearranging yields the exact Covered Interest Parity formula:

$$\frac{F}{S} = \frac{1 + r_{\text{USD}}}{1 + r_{\text{AUD}}}$$

Subtracting 1 from both sides yields the exact forward premium/discount formulation:

$$\frac{F - S}{S} = \frac{r_{\text{USD}} - r_{\text{AUD}}}{1 + r_{\text{AUD}}}$$

For modest interest rate levels, the denominator is close to 1, yielding the standard linear approximation:

$$\frac{F - S}{S} \approx r_{\text{USD}} - r_{\text{AUD}}$$

Economic Implication: If domestic interest rates exceed foreign interest rates ($r_{\text{AUD}} > r_{\text{USD}}$), the domestic currency must trade at a **Forward Discount** ($F < S$) in the forward market. Conversely, if domestic interest rates are below foreign rates ($r_{\text{AUD}} < r_{\text{USD}}$), the domestic currency trades at a **Forward Premium** ($F > S$).

4.2 Covered Interest Arbitrage (CIA)

If market exchange rates and interest rates diverge from the CIP relationship, arbitrageurs execute **Covered Interest Arbitrage (CIA)** to lock in riskless economic profits until market forces restore equilibrium:

- **Condition 1: If $\frac{F}{S} > \frac{1+r_{\text{USD}}}{1+r_{\text{AUD}}}$ (Forward rate overvalued relative to parity):** Arbitrageur borrows USD $\implies$ Converts to AUD at spot rate S $\implies$ Invests in Australian money market at r_{AUD} $\implies$ Sells future AUD proceeds forward at rate F. The inflow of arbitrage capital drives S up, F down, and adjusts interest rates until CIP holds.
- **Condition 2: If $\frac{F}{S} < \frac{1+r_{\text{USD}}}{1+r_{\text{AUD}}}$ (Forward rate undervalued relative to parity):** Arbitrageur borrows AUD at r_{AUD} $\implies$ Converts to USD at spot rate S $\implies$ Invests in US money market at r_{USD} $\implies$ Sells future USD proceeds forward (buys AUD forward) at rate F. The transaction generates guaranteed riskless profit.

4.3 Uncovered Interest Parity (UIP) & The Currency Carry Trade

While CIP involves hedging forward risk, **Uncovered Interest Parity (UIP)** assumes investors are risk-neutral and leave foreign currency investments unhedged. UIP asserts that the expected future spot exchange rate $E[S_{t+1}]$ will adjust to eliminate expected interest rate differentials:

$$\frac{E[S_{t+1}] - S_t}{S_t} = \frac{r_{\text{USD}} - r_{\text{AUD}}}{1 + r_{\text{AUD}}} \approx r_{\text{USD}} - r_{\text{AUD}}$$

Under UIP, an investor cannot generate excess expected returns by investing in high-interest-rate currencies because the high-yielding currency is expected to depreciate by an amount exactly equal to the interest rate advantage.

The Forward Rate Unbiasedness Hypothesis (FRUH): Combining CIP and UIP implies that the forward exchange rate is an unbiased predictor of the future spot exchange rate:

$$F_t = E[S_{t+1}]$$

DegreeLive

The UIP Puzzle and the Carry Trade: Empirical studies consistently document that UIP fails in the short and medium term. High-yielding currencies (such as the AUD during mining booms) frequently appreciate rather than depreciate. Global hedge funds exploit this market anomaly through the **Currency Carry Trade**: borrowing in a low-interest-rate funding currency (e.g. Japanese Yen at 0.25%) and investing in a high-interest-rate target currency (e.g. AUD at 4.35%) without forward hedging. While carry trades generate steady returns during calm market regimes, they are subject to severe "crash risk" during global liquidity crises, when sudden risk aversion triggers massive carry trade unwinding and rapid depreciation of the target currency.

4.4 Purchasing Power Parity (PPP) & Real Exchange Rates

Purchasing Power Parity (PPP) links exchange rates to national price levels based on the **Law of One Price (LOOP)**. LOOP states that in frictionless competitive international markets (free of transportation costs, tariffs, and trade barriers), identical goods must sell for the same price when converted into a common currency:

$$P_i = S \times P_i^*$$

Expanding the law of one price across broad consumer price index (CPI) baskets yields **Absolute PPP**:

$$S = \frac{P}{P^*}$$

Where P is the domestic price level and P^* is the foreign price level. Because trade barriers, non-tradable goods (housing, local personal services), and transportation costs prevent absolute price equalization, economists utilize **Relative Purchasing Power Parity (Relative PPP)**, which asserts that the percentage change in the exchange rate equals the inflation rate differential:

$$\frac{\Delta S}{S} \approx \pi_{\text{domestic}} - \pi_{\text{foreign}}$$

If Australia experiences an inflation rate of 5.0% while the United States experiences 2.0%, the Australian dollar must depreciate by approximately 3.0% against the US dollar to preserve relative purchasing parity.

The Real Exchange Rate (q): Measures the relative price of foreign goods to domestic goods:

$$q = \frac{S \cdot P^*}{P}$$

Where:

- If $q = 1$, purchasing power parity holds exactly.
- If q increases ($\Delta q > 0$), domestic goods become cheaper relative to foreign goods—representing a real currency depreciation that boosts domestic export competitiveness.
- If q decreases ($\Delta q < 0$), domestic goods become relatively more expensive—representing a real currency appreciation that harms export competitiveness.

The Balassa-Samuelson Effect: Explains why absolute PPP fails systematically between developed and developing nations. Countries experiencing rapid productivity growth in their tradable goods sector (manufacturing) experience higher national wage growth. These higher wages spill over into non-tradable service sectors, driving up overall domestic price levels and causing a permanent real exchange rate appreciation that deviates from standard PPP.

4.5 The International Fisher Effect (IFE)

The Fisher Effect states that the nominal interest rate r equals the expected real interest rate ρ plus expected inflation π^e:

$$1 + r = (1 + \rho)(1 + \pi^e) \quad \Longrightarrow \quad r \approx \rho + \pi^e$$

DegreeLive

Assuming international financial integration equalizes real interest rates across countries ($\rho_{\text{domestic}} = \rho_{\text{foreign}}$), the nominal interest rate differential must equal the expected inflation differential:

$$r_{\text{domestic}} - r_{\text{foreign}} = \pi^e_{\text{domestic}} - \pi^e_{\text{foreign}}$$

Combining the Fisher Effect with Relative PPP produces the **International Fisher Effect (IFE)**: the expected change in the spot exchange rate equals the nominal interest rate differential between two countries.

Chapter 5: Worked Step-by-Step Numerical Arbitrage & Parity Computations

5.1 Worked Numerical Example: Covered Interest Arbitrage Execution

A currency trader at an Australian institutional investment bank observes the following market data:

- Current Spot Exchange Rate: $S = 0.6500$ USD per 1 AUD.
- One-Year Forward Exchange Rate: $F = 0.6350$ USD per 1 AUD.
- Australian One-Year Interest Rate: $r_{\text{AUD}} = 4.50\%$ per annum (0.0450).
- US One-Year Interest Rate: $r_{\text{USD}} = 5.50\%$ per annum (0.0550).
- Available borrowing line: A$10,000,000 or equivalent in USD.

Step-by-step determination of parity and arbitrage strategy:

1. **Calculate Theoretical Parity Forward Rate (F_{CIP}):**

$$F_{\text{CIP}} = S \times \frac{1 + r_{\text{USD}}}{1 + r_{\text{AUD}}} = 0.6500 \times \frac{1 + 0.0550}{1 + 0.0450} = 0.6500 \times \frac{1.0550}{1.0450} \approx 0.6500 \times 1.009569 = 0.6562 \text{ USD}$$

2. **Compare Market Forward Rate against Parity:** The observed market forward rate is $F_{\text{market}} = 0.6350$. Because $F_{\text{market}} = 0.6350 < F_{\text{CIP}} = 0.6562$, the market forward rate undervalues the AUD (or overvalues the USD forward).
3. **Design the Arbitrage Strategy:** Because the market forward rate for the AUD is undervalued, the trader should borrow AUD, invest in the higher-yielding USD money market, and sell USD forward (buy AUD forward):
   - **Step 1:** Borrow A$10,000,000 in Sydney for 1 year at $r_{\text{AUD}} = 4.50\%$. The repayment liability at $T = 1$ is:

$$\text{Repayment} = \text{A\$10,000,000} \times (1 + 0.0450) = \text{A\$10,450,000}$$

   - **Step 2:** Convert the A$10,000,000 into USD at the current spot rate $S = 0.6500$:

$$\text{USD Acquired} = \text{A\$10,000,000} \times 0.6500 = \text{US\$6,500,000}$$

   - **Step 3:** Invest the US$6,500,000 in the US money market for 1 year at $r_{\text{USD}} = 5.50\%$. The accumulated USD proceeds at $T = 1$ will be:

$$\text{USD Proceeds} = \text{US\$6,500,000} \times (1 + 0.0550) = \text{US\$6,500,000} \times 1.0550 = \text{US\$6,857,500}$$

   - **Step 4:** Simultaneously enter into a one-year forward contract to sell US$6,857,500 forward (buy AUD forward) at the market forward rate $F = 0.6350$ USD per 1 AUD:

$$\text{AUD Received at } T = 1 = \frac{\text{US\$6,857,500}}{0.6350} \approx \text{A\$10,799,213}$$

Degreelive

4. **Calculate Guaranteed Riskless Arbitrage Profit:**

> $$\text{Net Arbitrage Profit} = \text{AUD Received} - \text{AUD Repayment} = \text{A\$10,799,213} - \text{A\$10,450,000} = \text{A\$349,213}$$

The trader generates a completely riskless profit of A$349,213 without committing any initial proprietary capital.

Chapter 6: Synthesis of International Financial Linkages

6.1 The Five Interlocking International Parity Relationships

The five central international parity conditions form an interconnected theoretical nexus in international financial economics:

Parity Condition	Key Economic Variables Linked	Theoretical Equation	Empirical Validity in Practice
Covered Interest Parity (CIP)	Spot rate, Forward rate, Nominal interest rate differential	$\frac{F}{S} = \frac{1+r^*}{1+r}$	Holds very tightly in developed markets during normal times; minor basis spreads emerge during banking crises.
Uncovered Interest Parity (UIP)	Spot rate, Expected future spot rate, Nominal interest rate differential	$\frac{E[S_{t+1}]-S_t}{S_t} \approx r^* - r$	Fails systematically in the short-to-medium run (the UIP carry trade puzzle); holds loosely over multi-year horizons.
Forward Rate Unbiasedness (FRUH)	Forward rate, Expected future spot rate	$F_t = E[S_{t+1}]$	Poor short-term predictor; forward rates often reflect risk premia rather than rational expectations.
Relative Purchasing Power Parity (RPPP)	Exchange rate change, Inflation rate differential	$\frac{\Delta S}{S} \approx \pi - \pi^*$	Poor predictor over monthly/quarterly horizons due to trade frictions; holds well over 5-to-10 year long-run horizons.
International Fisher Effect (IFE)	Exchange rate change, Nominal interest rate differential	$\frac{E[\Delta S]}{S} \approx r - r^*$	Holds over long horizons when real interest rate differentials across integrated capital markets converge.

Chapter 7: Foreign Exchange Market Microstructure & Settlement Risk

7.1 Electronic Limit Order Books & Two-Tier Market Architecture

While macroeconomic models treat the foreign exchange market as a frictionless aggregation, real-world currency prices are determined at the granular level through market microstructure. The FX market operates on a two-tier structural architecture:

1. **The Interbank Market:** The wholesale tier where large international commercial and investment banks trade directly with one another or via primary electronic broker platforms (Electronic Broking Services [EBS] for EUR/USD and USD/JPY, and Refinitiv Dealing for Commonwealth currencies like AUD/USD and GBP/USD). In this interbank limit order book, dealers post continuous limit orders (bids and offers), providing market depth and immediacy.
2. **The Client-to-Dealer Retail Tier:** Where non-bank corporations, institutional investors, and small hedge funds trade with primary dealers through single-bank platforms or multi-dealer portals (e.g. FXall, Bloomberg FXGO). Dealers intermediate order flows, taking the opposite side of client trades into their proprietary inventory.

Dealers set bid-ask spreads to compensate for two fundamental economic costs:

- **Inventory Holding Risk:** The risk that the exchange rate moves adversely while the dealer carries an unwanted long or short foreign currency position in inventory before it can be offloaded to another market participant.
- **Adverse Selection (Information Asymmetry) Cost:** The risk that an incoming counterparty possesses superior private information (e.g. an institutional macro fund front-running a large central bank intervention or commodity flow). To protect against informed traders, dealers widen their quoted spreads.

7.2 Settlement Risk and the CLS Bank Mechanism

In cross-border currency trading, parties face severe **Foreign Exchange Settlement Risk (Herstatt Risk)**—the risk that one party to a transaction delivers the currency it sold, but the counterparty defaults before delivering the currency it bought. This systemic risk was dramatically illustrated in 1974 when German regulators forced Bankhaus Herstatt into liquidation at 4:30 PM Frankfurt time.

degreelive

German counterparties had already paid Deutsche marks to Herstatt, but Herstatt's New York correspondent bank suspended payments before delivering the corresponding US dollars due to time zone differences, creating cascading international interbank liquidity freezes.

To eliminate systemic Herstatt risk, the global banking community and central banks established **CLS Bank (Continuous Linked Settlement)** in 2002. CLS operates a multilateral Payment-versus-Payment (PvP) settlement system. Under PvP, the settlement of both currency legs of an FX trade occurs simultaneously in real time across central bank real-time gross settlement (RTGS) accounts: neither currency is transferred unless the other currency is successfully settled. CLS currently settles 18 major global currencies, including the Australian dollar, eliminating settlement credit risk across trillions of dollars in daily turnover.

Chapter 8: The Australian Dollar as a Global Commodity Currency

8.1 Terms of Trade Dynamics & Resource Export Linkages

The Australian dollar (AUD) occupies a unique status in international financial markets. Despite Australia accounting for less than 2.0% of global GDP, the AUD is consistently the fifth or sixth most actively traded currency in the world. The AUD functions as a quintessential **Commodity Currency**, exhibiting strong positive correlation with global commodity price indices—particularly bulk iron ore, metallurgical coal, gold, and liquefied natural gas (LNG).

The primary macroeconomic transmission channel runs through Australia's **Terms of Trade (ToT)**, defined as the ratio of export prices to import prices:

$$\text{ToT} = \frac{P_X}{P_M}$$

When industrial production in China and emerging Asia expands, global demand for steel-making raw materials surges, driving up Australian export commodity prices ($P_X \uparrow$). The resulting surge in terms of trade generates massive domestic export revenue, expands corporate mining tax receipts, and drives large capital investment inflows into Australian resource infrastructure. The foreign demand for Australian dollars needed to settle resource shipments appreciates the AUD spot exchange rate.

Conversely, during global economic recessions or Chinese construction slowdowns, commodity prices plummet, terms of trade deteriorate, and the AUD depreciates sharply. Under Australia's post-1983 floating exchange rate regime, this currency depreciation operates as an automatic macroeconomic shock absorber: by making domestic services (higher education, inbound tourism) and non-mining manufacturing internationally price-competitive, a weaker AUD cushions the broader domestic economy against commodity shocks without requiring painful domestic nominal wage cuts.

Chapter 9: The Mechanics of Foreign Exchange Swaps (FX Swaps)

9.1 Spot-Forward and Forward-Forward FX Swaps

While currency forward contracts involve an outright future currency conversion, a **Foreign Exchange Swap (FX Swap)** is a simultaneous agreement between two counterparties to buy (or sell) a specified amount of foreign currency at the current spot exchange rate (the spot leg) and reverse the transaction at a specified future date at an agreed forward rate (the forward leg). FX swaps are the single largest component of global daily foreign exchange turnover, accounting for over 50% of total global FX volume according to the BIS.

The operational mechanics of an FX swap function as follows:

1. **Spot Leg at Inception ($T = 0$):** Counterparty A sells US$10,000,000 to Counterparty B at current spot rate $S = 0.6500$ USD/AUD, receiving A$15,384,615 in cash immediately.
2. **Forward Leg at Maturity ($T = 90$ days):** Counterparty A repurchases the US$10,000,000 from Counterparty B at the agreed forward rate $F = 0.6450$ USD/AUD, delivering A$15,503,876.
3. *Net Economic Nature:* An FX swap is economically equivalent to a collateralized currency loan. In the example above, Counterparty A effectively borrows Australian dollars for 90 days, pledging US dollars as liquid collateral. The difference between the spot price and the forward price (the swap points) reflects the interest rate differential between the two currencies.

FX swaps are heavily utilized by commercial bank liquidity desks and multinational corporate treasuries to rollover maturing forward contracts, manage multi-currency cash surpluses, and hedge short-term liquidity deficits without incurring open exchange rate risk.

Degreelive

Chapter 10: The Forward Premium Anomaly & The Fama Regression

10.1 Econometric Specification of the Forward Premium Anomaly

Under the joint hypothesis of Uncovered Interest Parity (UIP) and rational expectations, the forward rate is an unbiased predictor of the future spot rate (the Forward Rate Unbiasedness Hypothesis). Eugene Fama (1984) formulated the canonical econometric regression specification to test this hypothesis empirically:

$$\frac{S_{t+1} - S_t}{S_t} = \alpha + \beta \cdot (\frac{F_t - S_t}{S_t}) + \varepsilon_{t+1}$$

Where:

- $\frac{S_{t+1}-S_t}{S_t}$: The realized percentage change in the spot exchange rate from period t to $t+1$.
- $\frac{F_t-S_t}{S_t}$: The observed forward premium or discount at period t.
- α: Regression intercept (theoretically 0).
- β: The slope parameter (theoretically equal to 1.0 under UIP).

10.2 The Empirical UIP Puzzle and Theoretical Explanations

Dozens of empirical studies across developed floating currencies over multi-decade datasets document a startling empirical result: **the estimated slope coefficient β is almost universally negative (typically between -0.50 and -1.50)!** This empirical finding —known as the **Forward Premium Anomaly** or the **UIP Puzzle**—violates theoretical parity: currencies trading at a forward discount (currencies with high nominal interest rates) tend on average to *appreciate* rather than depreciate in the short and medium term!

Financial economists advance three leading explanations for this anomaly:

1. **Time-Varying Foreign Exchange Risk Premia:** Investors are not risk-neutral. Holding a high-yielding currency exposes investors to systematic global risk. The forward premium does not reflect expected depreciation alone, but also embodies a volatile, time-varying risk premium (Fama decomposition):

   $$\frac{F_t - S_t}{S_t} = E_t[\frac{\Delta S_{t+1}}{S_t}] + p_t$$

   Where p_t is the foreign currency risk premium. If the variance of the risk premium exceeds the variance of expected depreciation, the regression slope β naturally becomes negative.
2. **The Peso Problem:** Refers to a situation where market participants assign a positive probability to an infrequent, catastrophic event (such as a currency collapse, sovereign default, or banking crisis) that does not occur within the historical empirical sample window. The high interest rate compensates investors for this latent disaster risk, making realized short-term returns appear excessively profitable.
3. **Rational Inattention and Limits to Arbitrage:** Institutional capital constraints and transaction costs prevent cross-border arbitrageurs from instantaneously eliminating minor forward misalignments.

DegreeLive