Economics

- Currency Exchange Rates
- Economic Growth and The Investment Decision
- Economics of Regulation

Currency Exchange Rates

Exchange Rate

- Price/base currency
  - 1.4 USD/EUR
- Spot and forward
  - Spot: immediately delivery, usually two days
  - Forward: forward agreement

Spread

- Bid-offer price
  - $1.4124 – 1.4128
- Spread: offer price – bid price
  - Quoted in pips (1/10000)
- Dealer spread
  - Interbank spread
  - Size of transaction
    - Large -> wider spread
  - Relationship between dealer and client
    - Better -> tighter spread
- Interbank spread
  - Currencies involved
  - Time of day
    - Overlap during trading day -> more liquid -> narrow spread
    - The two largest, London and New York, overlap from approximately 8:00–11:00 a.m. NY time
  - Market volatility
  - maturity

Quotes investor (always a loss)

- base currency: sell at the bid, buy the ask
- price currency: buy at the bid, sell at the ask
- Bid-offer Equation
  - $\left(\frac{A}{B}\right)_{bid} \times \left(\frac{B}{A}\right)_{offer} = 1$
- Example
  - USD/AUD: 1 – 2 (bid – ask)
  - AUD/USD: ½ - 1 (bid – ask)
- rule
  - bid-ask, price-base, up-down, multiple-divide
  - up-the-bid-and-multiply
  - down-the-ask-and-divide

Cross Rate

- $\frac{A}{C} = \frac{A}{B} \times \frac{B}{C} = \frac{A/B}{C/B} = \frac{B/C}{B/A}$
- Spreads
  - $\left(\frac{A}{C}\right)_{bid} = \left(\frac{A}{B}\right)_{bid} \times \left(\frac{B}{C}\right)_{bid} = \frac{(B/C)_{bid}}{(B/A)_{ask}}$

- $\left(\frac{A}{C}\right)_{ask} = \left(\frac{A}{B}\right)_{ask} \times \left(\frac{B}{C}\right)_{ask} = \frac{(B/C)_{ask}}{(B/A)_{bid}}$

Triangle Arbitrage

- Clockwise and anticlockwise
- 类似于 short，先卖，再买回来还
  - A -> B -> C -> A

Forward rates

- Forward premium/discount
  - $forward\ premium\ (discount) = F - S_0$
  - If positive, the base currency is trading at premium
- Spot 1.0511, 30-day: +3.9 (points)
  - 30-day: 1.0511+3.9/10000=1.05149

Mark-to-Market

- Value of a forward contract
  - At initialization is zero
- Prior to expiration
- $V_t = \frac{(FP_t - FP)}{1+R_p \times t} \times contract\ size$
  - V_t value of the contract at time t to the party **buying** the **base** currency denominated in the **price** currency
  - FP_t forward price (to sell base currency) at time t for a new contract maturing at time T
  - FP forward price specified in the contract at inception (to **buy** the base currency)
  - $t = \frac{days}{360}, days$ number of days remaining to maturity of the forward contract (T-t)
  - R_p interest rate of **price** currency
- 如果合同是买 base currency，那么对冲就是卖 base currency，用 **bid** 汇率。
  - 盈利：卖出 FP_t – 买入 FP
- 如果合同是**卖** base currency，那么对冲就是买 base currency，用 **offer 汇率**。
- 按照 price currency 折现，考虑时间

Covered Interest Rate Parity

- Forward premium or discount exactly offsets differences in interest rates
- Given A/B structure
  - $F = S_0 \frac{1+R_A \times \frac{days}{360}}{1+R_B \times \frac{days}{360}}$
  - $F - S_0 = S_0 \frac{\frac{days}{360}}{1+R_B \times \frac{days}{360}} (R_A - R_B)$
- Properties
  - Bound by arbitrage
  - Derive the no-arbitrage forward rate

Uncovered Interest Rate Parity

- Conditions to prevent arbitrage
  - forward currency contracts are not available
  - capital flows are restricted
- Given A/B structure
  - $F - S_0 = S_0(R_A - R_B) \rightarrow \frac{F-S_0}{S_0} = R_A - R_B$
  - $\rightarrow \boldsymbol{E(\%\Delta S) = R_A - R_B}$
    - $\%\Delta S = \frac{S_t - S_0}{S_0}$ assume $F = E(S_t)$
- Properties
  - Not bound by arbitrage
  - Assume **risk-neutral**
  - Derive the expected **future spot** rate
  - Not hold in short run, but it does generally hold in the long run

Forward Rate Parity

- If forward rate is equal to the expected future spot rate
  - Forward rate is an **unbiased** predictor of future spot rate
- $F = E(S_t)$
- Properties
  - If covered interest parity holds, uncovered interest parity would also hold (and vice versa)
  - If uncovered interest parity holds, forward rate parity also holds

Domestic Fisher Relation

- $R_{nominal} = R_{real} + E(inflation)$

Real interest rate Parity

- Real interest rates converge across different markets
- Based on free capital flows
  - Funds will move to country with a higher real rate until they are equalized

International Fisher Relation

- When real interest rate parity holds
  - $R^A_{nominal} - R^B_{nominal} = E(inflation_A) - E(inflation_B)$

Purchasing Power Parity

- Law of one price
  - Frictions: tariffs, transportation costs

Absolute Purchasing Power Parity

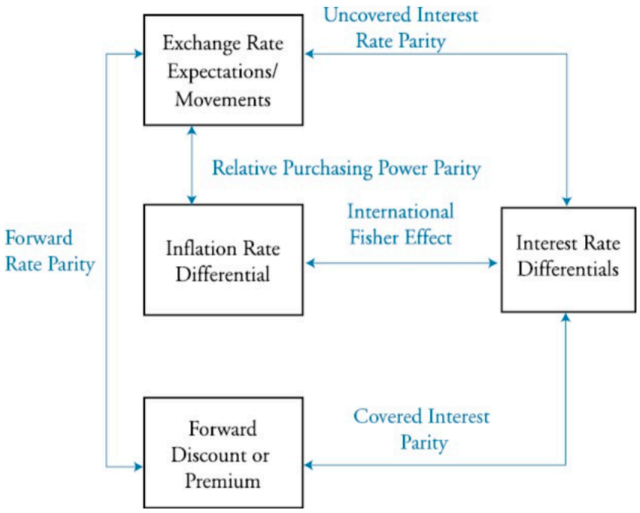
- Assume law of one price is correct on average for like baskets of good in each country
- $S = \frac{CPI_A}{CPI_B}$
- In practice, might not hold because the weights of goods in different economics may not be the same

Relative Purchasing Power Parity

- Exchange rates should offset price effects of any inflation differential between two countries
- $\%\Delta S = Inflation_A - Inflation_B$
    - Actual inflation

Ex-Ante Relative Purchasing Power Parity

- Same as relative purchasing power parity except that is uses expected inflation instead of actual inflation
- $\%\Delta S = E(Inflation_A) - E(Inflation_B)$
- Properties
    - Not hold in short run



FX Carry Trade

- Invest in high yielding currency using funds borrowed in a lower yielding currency
    - The lower yielding currency is called the **funding** currency
- Return = interest earned on investment – funding cost – currency depreciation
- Given A/B (assume A has a higher interest yield) 借利息低的，投资利息高的
    - Given 1 with B currency, convert to S_0 B
    - invest return is $S_0\ (1 + R_A)$, convert back $\frac{S_0}{S_1}(1 + R_A)$
        - $S_0 < S_1 \rightarrow S_0 = S_1(1 - R_S)$ currency B depreciation
        - If treat A as base currency, it will depreciation
            - $S_0 = S_1(1 - R_S) \rightarrow \frac{1}{S_1} = \frac{1}{S_0}(1 - R_S)$ depreciation
    - Pay back principle and interest $1 + R_B$
    - Total return is
        - $\frac{S_0}{S_1}(1 + R_A) - (1 + R_B) = (1 - R_S)(1 + R_A) - (1 + R_B)$
        - $\rightarrow R_A - R_B - R_S$
- Properties
    - Bet against uncovered interest rate

    - Perform well during low-volatility periods
    - **Leverage** is the primary factor of large loss
    - High yields attract larger capital flows -> lead to economic boom and appreciation
- Risk
    - Funding may appreciate significantly against the currency of investment
    - Return distribution is not normal
    - Crash risk: high probability of a large loss
        - More people buy high-yielding currency
        - More people exit (sell) high-yielding currency
        - Lead to steep decline in value

Balance of Payments

- BOP accounting
- Current Account
    - Exchange of goods, services, investment income, and unilateral transfers
    - Surplus: sell more to foreign country
    - Deficit: buy more from foreign country
- Financial/Capital Account
    - Flow of **debt and equity** investment into and out of the country
- Current account deficit
    - Generate a surplus in capital account or its currency depreciate
- Capital flow is a dominant factor influencing exchange rate in the short term
    - Large and more rapid

Current Account Influence on exchange rates

- **Flow supply/demand mechanism**
    - Deficit -> increase currency supply -> currency depreciation -> more exports, less import -> restore balance
    - Factors
        - Initial deficit
        - Influence of exchange rates on domestic import and export prices
            - Cost of imported goods increase
        - Price elasticity of demand of traded goods
            - Relatively price inelastic
    - Such shifts in currency demand should exert upward pressure on the value of the surplus nation's currency and downward pressure on the value of the **deficit** nation's currency.
    - We would expect that countries with persistent current account **surpluses** would see their currencies **appreciate** over time and vice versa.
- Portfolio balance mechanism
    - Investor countries find portfolio dominated by few investee currencies
    - Investor countries rebalance -> negative impact on investee currencies
    - imbalances **shift** financial wealth from **deficit** nations to **surplus** nations
- Debt sustainability mechanism
    - Deficit -> borrow money -> debt too high -> repaid depreciation

- For deficit countries, rising net external debt levels as a percentage of GDP should result in downward revisions of the currency's long-run equilibrium value.
- For surplus countries, rising net external asset levels as a percentage of GDP should give rise to upward revisions of the currency's long-run equilibrium value.

Capital Account Influence on exchange rates

- Factor: Real rates differences 真实利率差异
- Excessive capital flow creates problems
  - Excessive real appreciation of domestic country 升值
  - Financial asset and real estate **bubbles 泡沫**
  - Increase in external debt
  - Excessive consumption fuelled by credit 过度消费
- Capital controls or direct intervention in foreign exchange markets

Monetary and Fiscal Policy on exchange rates

- Mundell-Fleming Model (ignore **inflation**) 不考虑通货膨胀
  - Assumes sufficient slack to handles changes in aggregate demand
  - Ignore changes in **inflation** due to monetary and fiscal policy
- Flexible exchange rate regimes
  - By supply and demand
- High Capital Mobility – developed countries **对外**资金供需的影响
  - Expansionary monetary and restrictive fiscal -> depreciation
    - 利率的吸引：低利率 -> 资金外出 -> 货币贬值
    - 政府是否需要钱：政府**支出**降低 -> 需要外资减少 -> 货币贬值
  - Restrictive monetary and expansionary fiscal -> appreciation
- Low Capital Mobility – developing countries **对内物品**供需的影响: 通货膨胀\紧缩
  - Impact of trade (goods flow) is greater than interest rates (financial flow)
  - Expansionary monetary and Expansionary fiscal -> depreciation
    - Low interest -> more money -> depreciation
      - 低利率 -> 可以借钱更多 -> 通货膨胀 -> 货币贬值
    - Lower tax, more spending -> depreciation
      - 低税收 -> 用于消费的钱更多 -> 通货膨胀 -> 货币贬值
  - Restrictive monetary and Restrictive fiscal -> appreciation
    - High interest -> less money to borrow -> appreciation

Monetary Policy/Fiscal Policy		
	High	**Low**
Expansionary/Expansionary	Uncertain	Depreciation
Expansionary/Restrictive	Depreciation	Uncertain
Restrictive/Expansionary	Appreciation	Uncertain
Restrictive/Restrictive	Uncertain	Appreciation

- Trick
  - Monetary
    - expansionary -> depreciation 钱多了，会贬值
    - restrictive -> appreciation 钱少了，会升值
  - Mobility
    - 政府
      - 支出：对外，增加会吸引外部资金，导致外汇直接升值
      - 税收：对内，减少会增加国内资金，通货膨胀，导致贬值
    - High: Fiscal and Monetary differ to confirm 流动好，政策相反
    - Low: Fiscal and Monetary same to confirm 流动不好，政策相同
- Fixed Exchange Rate Regimes
  - Expansionary (restrictive) monetary leads to depreciation (appreciation) of domestic currency, and government have to purchase (sell) in foreign market to reverse.

Monetary Approach to Exchange Rate Determination

- Assumption
  - **Output** is fixed
  - monetary policy -> **inflation** -> exchange rate
- Pure Monetary model
  - Expansionary monetary -> low interest, more money -> more demand, high price -> depreciation
  - Ignore expectations about future monetary expansion or contraction
- Dornbusch **overshooting** model
  - Prices are sticky in the short term and is not affected by monetary policy
  - Exchange rates will **overshoot** the long-run PPP value in the **short** term
  - Expansionary - convex curve 下降过快，之后回升
    - Expansionary monetary -> low interest -> **larger depreciation** due to capital outflows -> long term will increase to PPP implied value
  - Restrictive -> concave curve 上升过快，只有下落
    - Short term -> appreciate too much
    - Long term -> decrease to PPP implied value

Portfolio Balance Approach to Exchange Rate Determination

- Focus on **Fiscal** policy in the **long**-term
  - Sustained fiscal deficit or surplus
- Fiscal deficit -> borrow money -> capital inflow -> appreciation
  - But too much deficit -> higher risk -> capital outflow -> depreciation
- Combine Mundell-Fleming and Portfolio balance
  - Expansionary fiscal
    - Short term -> appreciation 短期升值
    - Long term -> depreciation 长期贬值
      - Reverse course (tighter fiscal policy)
      - Monetize debt (print money)

Compare

- Mundell-Fleming
    - Ignore inflation
    - Focus on short-term monetary and fiscal policy
- Monetary Approach
    - Focus on monetary policy
- Portfolio Balance Approach
    - Focus on long-term fiscal policy (reverse effects)

Central Bank Intervention

- Objectives
    - Domestic currency does not appreciate excessively
    - Pursuit of independent monetary policy
    - Reduce aggregated volume of inflow of foreign capital
- Effectiveness
    - Developed countries -> ineffective
    - Emerging countries -> effective if have reserves

Currency Risks

- Term of trade (ratio of exports to imports) deteriorate
- Fixed or partially-fixed exchange rates
- Reverses dramatically decline
- Inflation increases
- Liberalized capital markets, that allow for the **free flow** of capital
- Money supply relative to bank reserves increases
- Banking crises (may be coincident)
    - Short-term foreign funding

Economic Growth and The Investment Decision

Preconditions for Growth

- Savings and investment
- Financial markets and intermediaries
- Political stability, rule of law, property rights
- Investment in human capital
- Tax and regulator systems
- Free trade and unrestricted capital flows

Equity Prices and Potential GDP Growth

- GDP based on purchasing power parity
- $P = \frac{P}{E} \times \frac{E}{GDP} \times GDP$
- $\boldsymbol{\Delta P = \Delta\left(\frac{P}{E}\right) + \Delta\left(\frac{E}{GDP}\right) + \Delta(GDP)}$
- Over long term
  - $\Delta\left(\frac{P}{E}\right) = 0$
  - $\Delta\left(\frac{E}{GDP}\right) = 0$
  - $\Delta P = \Delta GDP$

Effects on Equity and Fixed-income

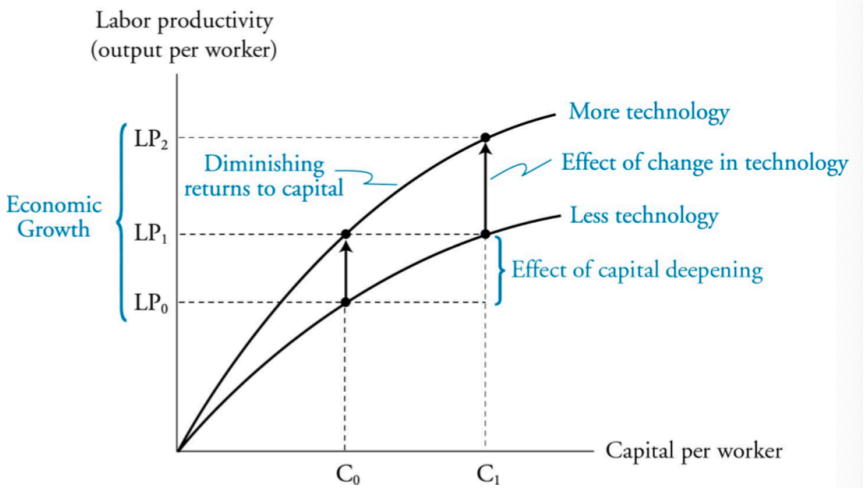
- Equity
  - GDP is a main driver
- Fixed-income (Real interest rate) – potential GDP growth
  - Positive GDP growth -> consume more -> to encourage saving, investment has to offer **higher** rate of return
  - High potential GDP growth -> higher real interest rate and real asset returns
- Fixed-income (Credit risk)
  - Direct and positive relationship between GDP growth and credit quality
  - Growth in GDP -> reduce expected credit risk and increase the quality of debt issues
- Short term, actual and potential GDP provide insight
  - Actual > potential
    - Rising price -> inflationary pressure
    - monetary policy: restrictive
    - fiscal policy
  - Actual < potential
    - Less inflation
    - monetary policy: expansionary -> downward pressure
    - Fiscal policy: deficit (expansionary)

GDP (two-factor)

- Cobb-Douglas production function
- $Y = TK^{\alpha}L^{1-\alpha}$
  - Y: GDP
  - K: capital

- L: labor
- α: labor share of total factor cost
- L: scale factor related to technology, total factor productivity (TFP)

- **Constant return to scale**
  - Increase labor and capital by a fixed amount leads to the same percentage increase in output
  - If all inputs are increased at the same percentage, then output rises at that percentage
- **Capital deepening**
  - Assume number of workers and α remain constant, increasing capital has limited effects because $\alpha < 1$.
- **Diminishing marginal productivity**
  - It exists with respect to each individual input (if the other input is held constant).
- **Labor productivity**
  - $\frac{Y}{L} = T\left(\frac{K}{L}\right)^{\alpha}$
    - $\frac{K}{L}$: capital per worker
    - $\left(\frac{K}{L}\right)^{\alpha}$: capital deepening
  - $\alpha < 1$ diminishing effect on productivity
  - Developed countries
    - High $\frac{K}{L}$ and low α
  - $\frac{Y}{L} = T\left(\frac{K}{L}\right)^{\alpha} \rightarrow \frac{\Delta y}{y} = \frac{\Delta T}{T} + \alpha\frac{\Delta k}{k}$
    - **Labor productivity growth rate = technological growth + capital deepening ($\alpha\frac{\Delta k}{k}$)**
- Marginal Product of Capital
  - $\frac{\Delta Y}{\Delta K} = \alpha\frac{Y}{K}$
  - Marginal cost of capital r



- **Growth Accounting Relation**
  - $Y = TK^{\alpha}L^{1-\alpha} \rightarrow \log Y = \log T + \alpha \log K + (1-\alpha)\log L$
  - $\rightarrow \frac{\Delta Y}{Y} = \frac{\Delta T}{T} + \alpha\frac{\Delta K}{K} + (1-\alpha)\frac{\Delta L}{L}$
- **Labor Productivity Growth**

- $Y = \frac{Y}{L} \times L \rightarrow \frac{\Delta Y}{Y} = \frac{\Delta(Y/L)}{Y/L} + \frac{\Delta L}{L}$
- Growth rate in **potential** GDP = Long-term growth rate of labor force + Long-term growth rate in labor productivity

Natural Resources

- Does not necessary constrain growth
  - **Access** to natural resources does not require **ownership** of resources
    - Resource poor can access via trade (Japan)
- Resources actually **inhibit** growth
  - Focused on those resources rather than developing other industries
  - Dutch disease
    - Resource -> prices increase -> currency appreciation -> export hard globally uncompetitive

Labor factors

- Quantify of labor L is the size of labor force multiplied by the average hours worked
- Labor force
  - Number of working age people (16 - 64) available to work, both employed and unemployed
- Factors
  - Demographics
  - Labor force participants
    - Labor force / working age people
  - Immigration
  - Average hours worked
    - Developed countries, it is downward
    - Wealth effect -> more leisure time, high tax, more part-time

Other Factors

- Human Capital
  - Knowledge and skills
  - Education or work experience
  - External spill over -> knowledgeable workers innovate
- Physical
  - Infrastructure, computers, telecommunications (ICT)
  - On-ICT capital (machinery, transportation)
- Technological Development
  - Include investment in both physical and human capital
  - Developed
    - More R&D
  - Less Developed
    - Copy and less R&D
- Public Infrastructure

Classical Growth theory

- In long-term, **population** growth increases whenever there are increases in per capita **income** above subsistence level (minimum to maintain life) due to an increase in capital or technological progress.
- Prevent long-term growth in per capita income
    - Population explosion -> diminishing return -> reduce productivity -> back to subsistence level
- Gains in per capita GDP are **temporary** because the resulting population explosion will **lower** per capita GDP to subsistence real wage levels
- Not supported by empirical evidence

Neoclassical Growth Theory (steady state, diminishing marginal return)

- Long-term **steady state** growth rate
    - Output-to-capital ratio is constant
    - L/K and Y/L grows at equilibrium growth rate, g^*
    - Technology growth at θ
- Sustainable growth of output per capita g^*
    - $\frac{Y}{L} = T\left(\frac{K}{L}\right)^{\alpha} \rightarrow \frac{\Delta y}{y} = \frac{\Delta T}{T} + \alpha\frac{\Delta k}{k} \rightarrow g^* = \theta + \alpha g^*$
    - $\rightarrow \boldsymbol{g^* = \frac{\theta}{1-\alpha}}$
- Sustainable growth rate G^*
    - $Y = \frac{Y}{L} \times L \rightarrow \frac{\Delta Y}{Y} = \frac{\Delta y}{y} + \frac{\Delta L}{L} \rightarrow \mathbf{G}^* = \boldsymbol{\frac{\theta}{1-\alpha} + \frac{\Delta L}{L}}$
- Properties
    - Capital deepening
        - Affect **level** of output but not the **growth**
    - MPK is constant, but productivity is diminishing
    - Developing countries have higher growth rates because they are less impacted by diminishing productivity
    - The **growth** rate of output does not depend on the accumulation of capital or the rate of business investment. **Capital** accumulation affects the **level** of output.
    - Such factors as the saving rate, the growth rate of the labor force, and the depreciation rate change the **level** of output per worker but do not permanently change the **growth** rate of output per worker
    - A permanent increase in the growth rate in output per worker can only occur if there is a change in the growth rate of TFP.
- **Convergence**
    - Absolute convergence
        - Less developed countries will achieve equal living standards over time
        - Have access to the same technology
    - Conditional Convergence
        - Only occur for countries with the same savings rate, population growth rates, and production functions.
    - Club Convergence
        - Part of a club

Endogenous Growth Theory (Steady -> Permanent)

- Technological growth emerges as a result of **investment** in physical and human capital
- No steady state growth rate, increased investment can **permanently** increase the rate of growth
- Assume return to capital is constant
- Capital investment -> improve total factor productivity
- saving and investment decisions can generate self-sustaining growth at a permanently higher rate.

Private investment – Endogenous growth model

- Social return

Trade Barrier on Economic Growth

- Speedup
- Knowledge capital do not follow no law of diminishing return

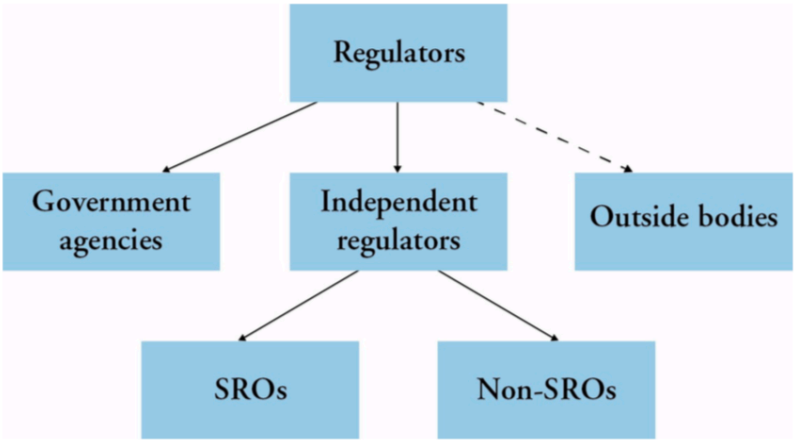
Economics of Regulation

Regulations Forms

- Statues
  - Legislative bodies
- Administrative
  - Government agencies or other bodies authorized by government
- Judicial law
  - Findings of the court

Regulation Bodies

- Independent Regulators
  - Given recognition by government agencies
  - Some are SRO
  - Not all SROs are independent
  - SRO may have conflicts of interest
- Outside bodies
  - Not regulators but their product is referenced by regulators
  - FASB and IASB



SRO

- Some independent regulators are SROs empowered to enforce the law
- They do not typically rely on government funding
- FINRA recognized by SEC
- Civil-law countries
  - Government agencies fulfil roles of SRO
  - No independent SRO
- Common-law (UK, US)
  - Independent SRO

Economic Rationale

- Informational frictions
  - Not equally distributed
  - Information asymmetry
- Externalities

    - Costs or benefits affect a party that did not choose to incur that cost or benefit
    - Public goods: parks, national defense

Regulatory Interdependencies

- Regulatory capture theory
    - Regardless of original purpose, a regulatory body will be influenced or even possibly controlled by the industry that's being regulated
- Regulatory competition
    - Regulators compete to provide most business-friendly regulatory environment.
- Regulatory arbitrage
    - Exploit difference between economic substance and interpretation of a regulation
    - **Cooperation** at a global level to achieve a cohesive regulatory framework
    - Within a country, conflict between objectives of different bodies
- Coase theorem
    - if an externality can be traded and there are no transaction costs, then the allocation of property rights will be efficient and the resource allocation will not depend on the initial assignment of property rights.

Regulatory Intervention Tools

- Price mechanism
    - Taxes, subsidies
- Restricting/requiring certain activities
- Provision of public goods or financing of private projects
- Effectiveness depends on enforcement abilities

Commerce Regulation

- An essential framework to facilitate business decision making.
- May facilitate or hinder commerce

Financial Markets Regulation

- Regulation of security markets and financial institutions
- Prevent failure of financial system
- Protecting investors, creating confidence in markets, enhancing capital formation.

Security Markets Regulation

- Ensure fairness and integrity of capital markets and protect investors
- Disclosure requirements, transparency, investor confidence
- Mitigating agency problem
- Protect small (retail) investors
    - Relatively lax regulatory coverage of hedge funds and private equity funds

Financial Institutions Regulation

- **Prequential supervision**
    - Monitor and regulation to reduce **system-wide** risks

- Cost-benefit analysis include hidden costs
    - Insurance for banks may provide excessive risk-taking (moral hazard)

Antitrust Regulation

- Regulation often hinder foreign competition to protect domestic business by promoting domestic competition
- Antitrust laws restrict activities that **reduce or distort** competition
- Blocks a merger that leads to excessive concentration of market share.
- Anticompetitive Behaivors
    - Discriminatory pricing, bundling, exclusive dealing

Regulation Costs-Benefits

- Cost: implementation costs
- Regulatory/government burden
    - Cost of compliance for regulated entity
- Net regulatory burden
    - Regulatory burden – **private** benefits of regulation
- Unintended consequences
- Sunset clause
    - Difficult to assess before it put in place
    - Revisit the cost-benefit based on actual outcomes before renewal

Regulation Effects

- Help or hinder a company or industry
- May introduce inefficiencies in the market