Introduction

A Quick Tour of Asian Economies

Asia, Then and Now I

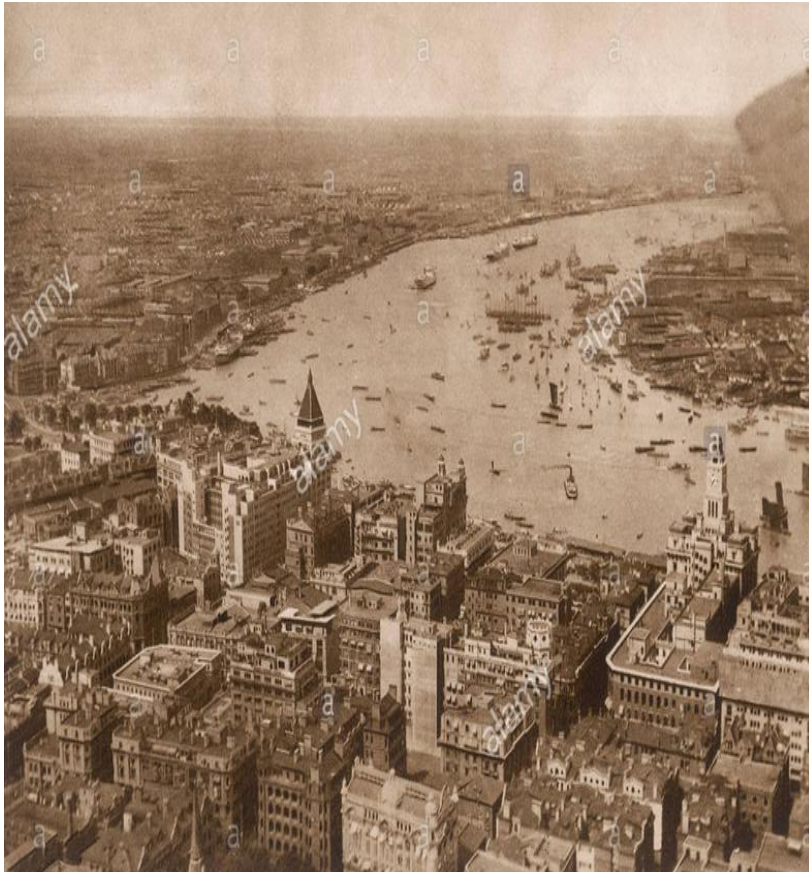**Downtown Tokyo, 1945, after firebombing**
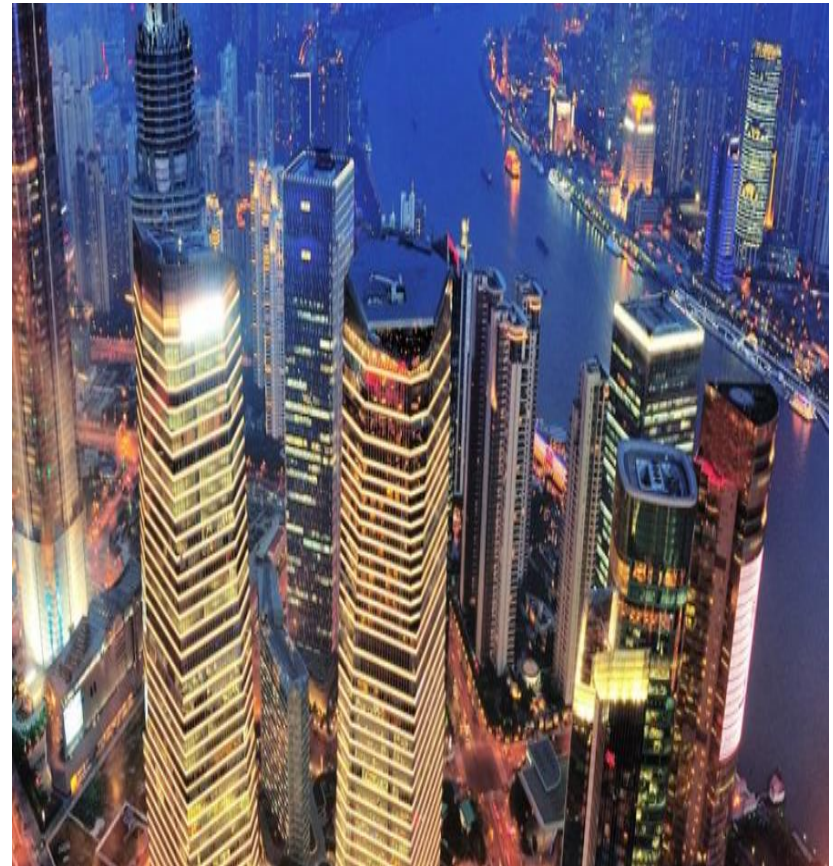
Downtown Tokyo, 2007

Asia, Then and Now II

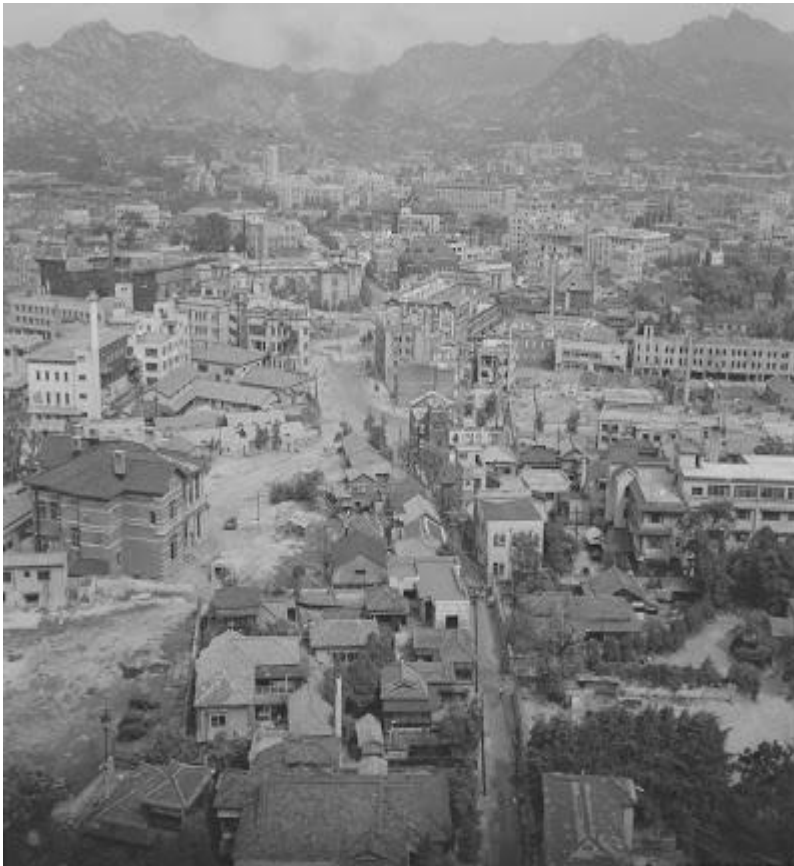**Downtown Shanghai, 1920, pre-Revolution**   **Downtown Shanghai, 2016**

Asia, Then and Now III

Downtown Seoul, 1951, during Korean War

Downtown Seoul, 2013

Asia, Then and Now IV

Kuala Lumpur, 1956, before independence   **Kuala Lumpur, 2013**
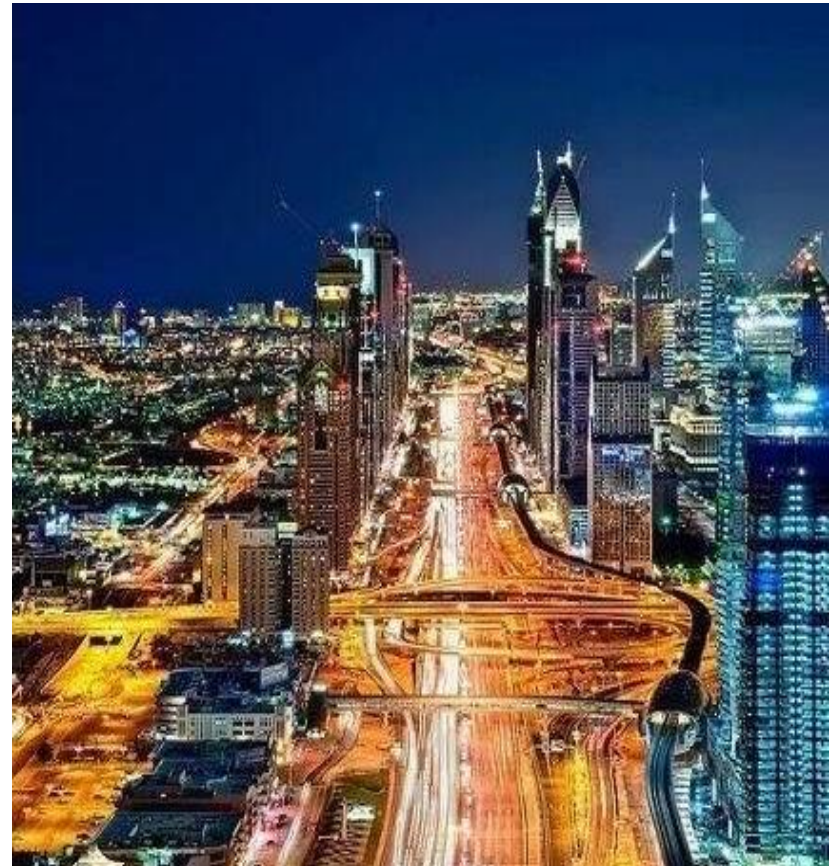
Asia, Then and Now V

Downtown Dubai, 1980, pre-liberalization

Downtown Dubai, 2013

Asia, Then and Now VI

The Diverse Economies of Asia I

- Asia encompasses an extremely diverse set of economies
  - From high-income economies…
    - Japan
    - "Newly"-Industrialized Economies (NIEs) ("Dragons")
    - Resource-rich modern economies (GCC)
  - …to fast-growing, but still developing countries…
    - China
    - Next-wave industrializers (e.g. Indonesia, Malaysia) ("Tigers")
  - …to some of the poorest nations
    - India
    - North Korea, Nepal, Myanmar

The Diverse Economies of Asia II

- Asian economies have diverse institutional structures
  - From the market-oriented, business-friendly…
    - Japan
    - Hong Kong
  - …to the centrally-planned, state-centric ones…
    - China
    - North Korea, Myanmar
  - …and those either in transition or practicing significant *dirigisme*
    - India
    - French Indochina
    - South Korea, Taiwan, Singapore

The Diverse Economies of Asia III

- Asian countries have diverse political histories
  - Colonies
    - Great Britain (Hong Kong, Straits Settlements, India, Burma)
    - France (Indochina)
    - Netherlands (Indonesia)
    - United States (Philippines)
    - Japan (Korea)
  - Communism
    - China, North Korea, North Vietnam, Laos
  - Democracies vs autocracies
   - India and Mongolia vs China and Saudi Arabia

Key Features of Asia's Development Experience

- Rapid, sustained growth led by capital accumulation
  - Expenditure on compulsory education led to human capital buildup
  - High saving/FDI supported rapid physical capital expansion
  - Limited TFP contribution except in largest economies
- Export-oriented development model
  - Growth takeoffs after abandonment of import-substitution strategy
  - Export focus not always accompanied by overall trade openness
  - Subsidies for targeted sectors financed partly by financial repression
- Formative effects of financial crises
  - 1991 balance of payments crisis (South Asia) and asset bubble (Japan), 1997 Asian financial crisis (East Asia), 2007/8 global financial crisis (West Asia)

East Asian schooling started from a relatively low base but rose rapidly, and since 1990, a similar pattern is emerging in South Asia

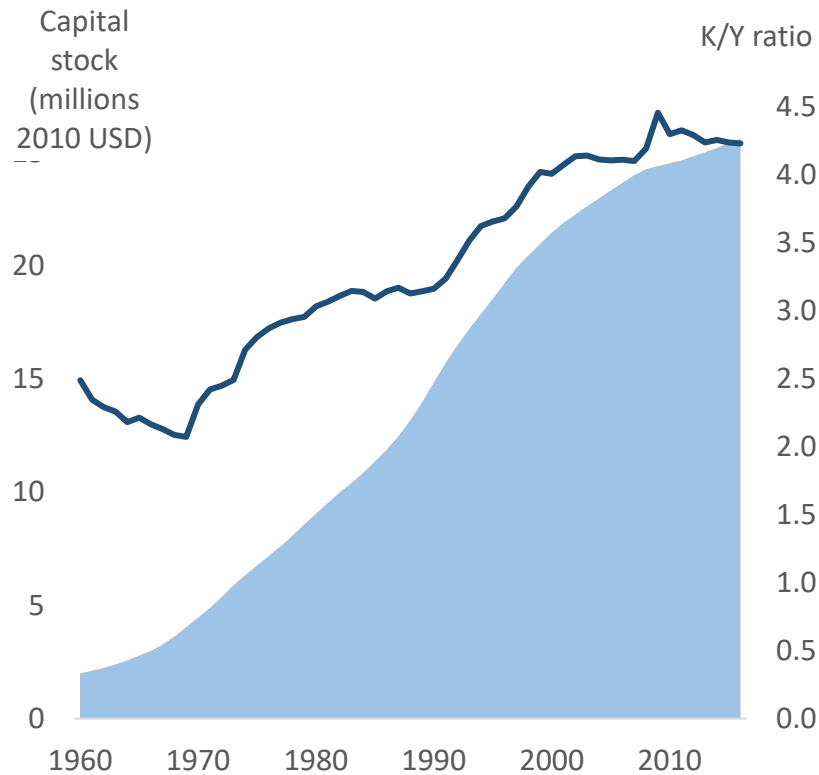Average years of schooling, by region, 1950-2010
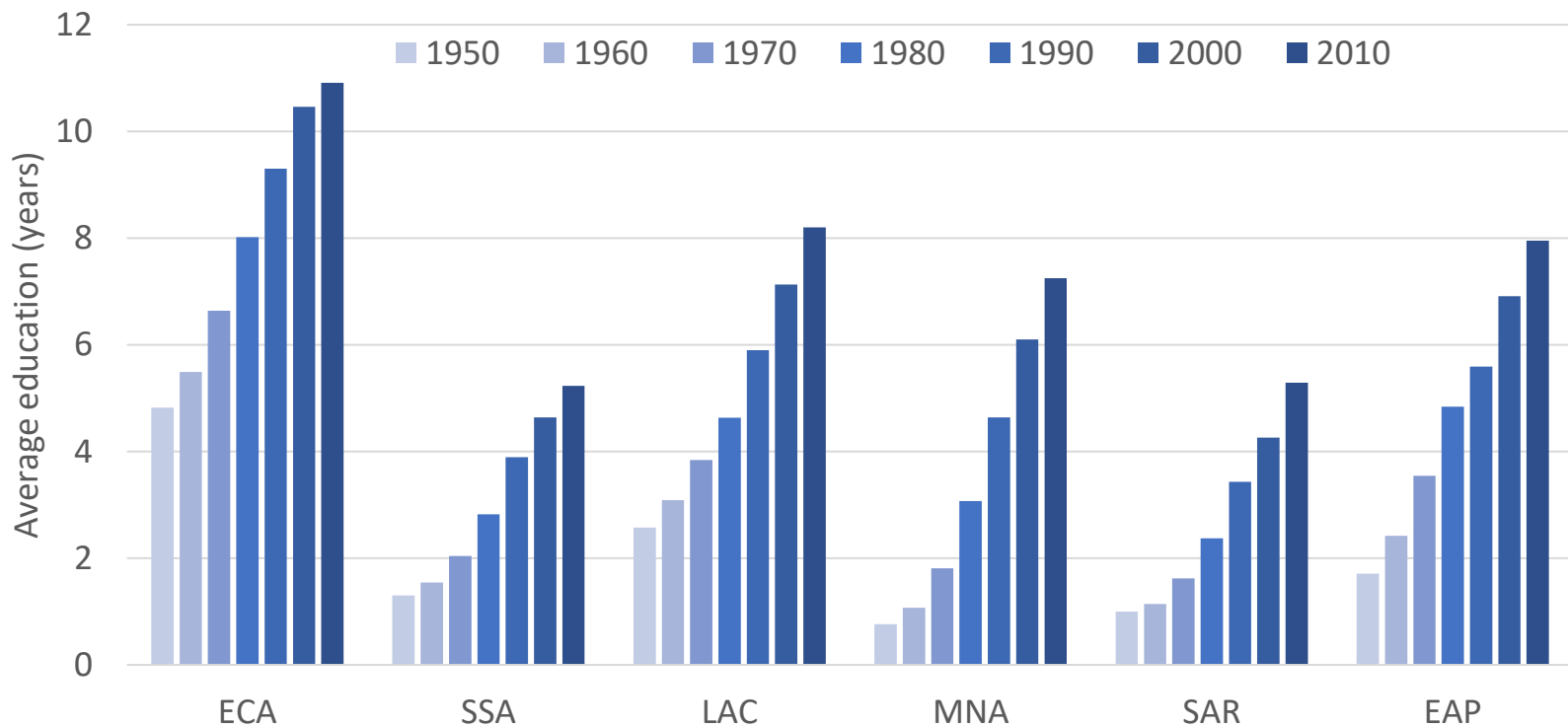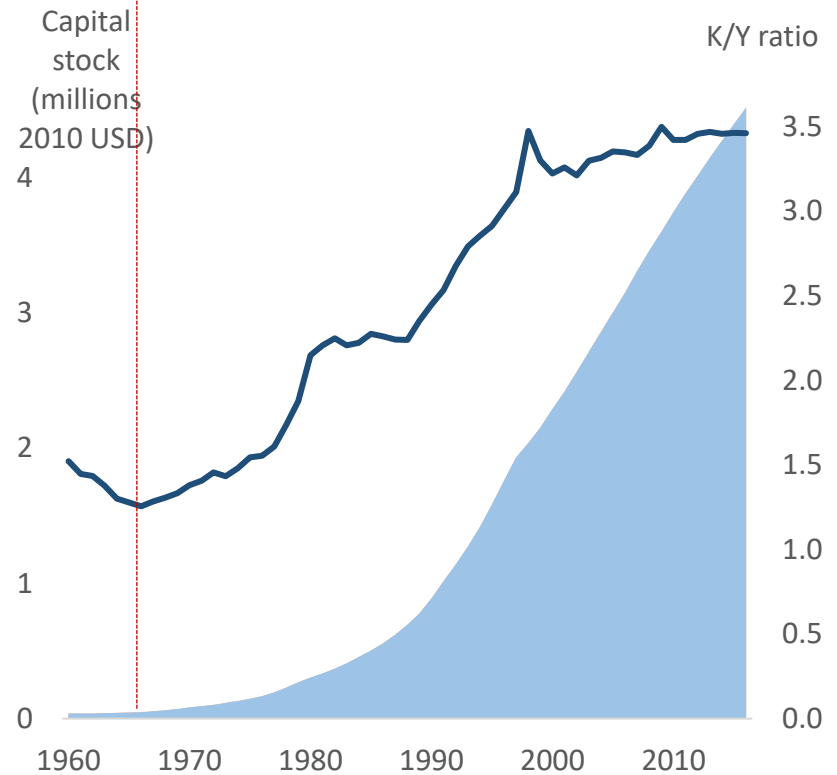
Source: Author's calculations, from Barro & Lee (2013)

High investment has given rise to economies with some of the greatest capital intensities worldwide…

Physical capital accumulation, Japan, 1960–2016

Physical capital accumulation Korea, 1960–2016

Source: Author's calculations, from World Bank (2017)

Source: Author's calculations, from World Bank (2017)

…even for the economies that pursued investment-intensive export-oriented strategies relatively late
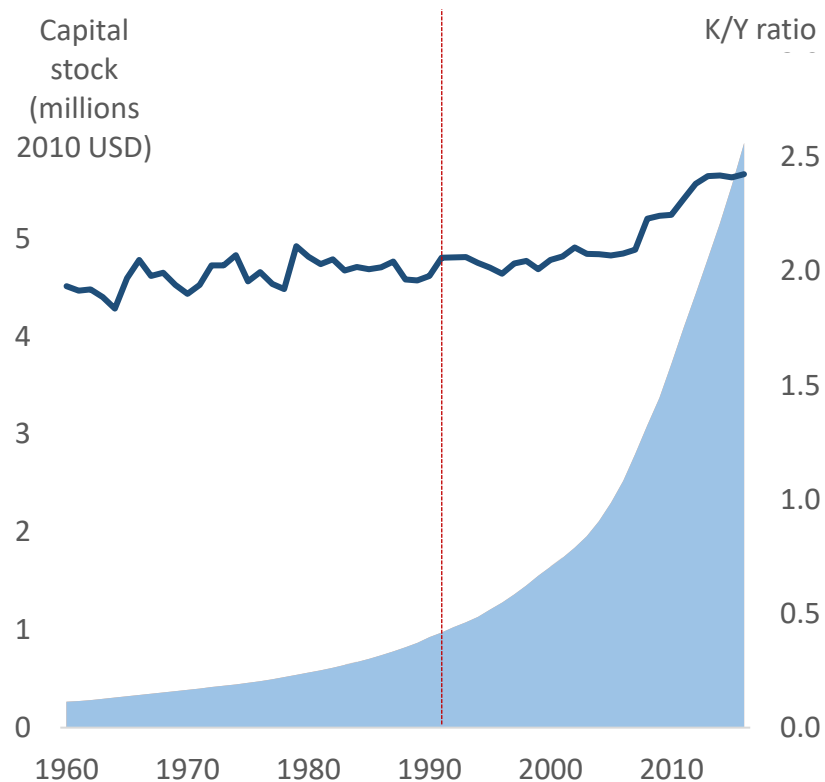
Physical capital accumulation, China, 1960–2016
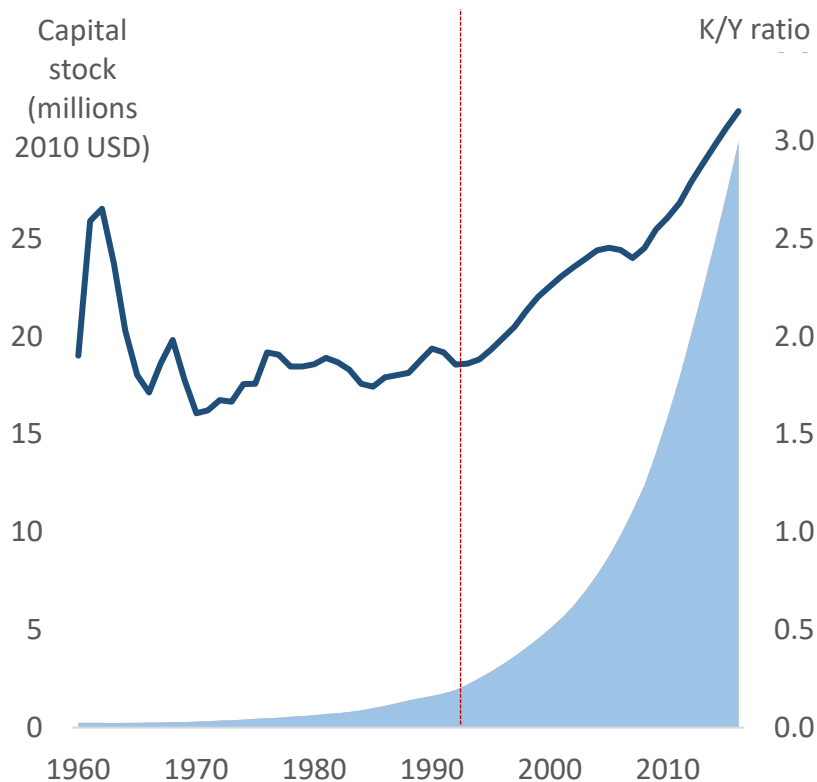
Physical capital accumulation India, 1960–2016

Source: Author's calculations, from World Bank (2017)

Source: Author's calculations, from World Bank (2017)

Industrial robot usage, Asia, 2017

- Asia has the highest industrial robot density in the world, accounting for 65 percent of the world total
- China is the largest user within Asia, accounting for 50 percent

I, Robot

Asia is the global leader in employing robots for manufacturing, with an estimated 65 percent of the world's total industrial robot usage.

(percent)

Unspecified 1.3%
Africa 2.8%
America 13.6%
Europe 17.3%
Asia 65.0%

Taiwan Province of China 4%
Thailand 1%
Other Asia 7%
Korea 19%
China 50%
Japan 18%
India 1%
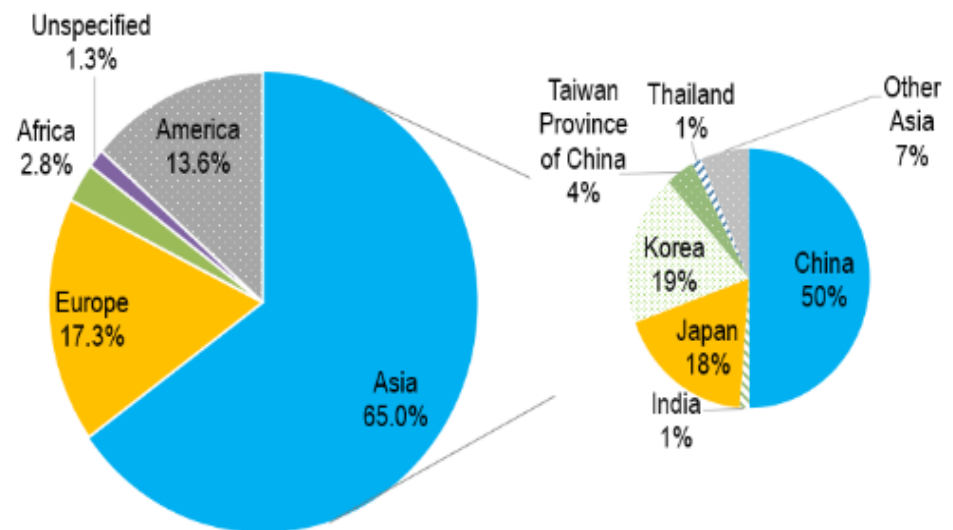
Sources: International Federation of Robotics; and IMF staff calculations.

But rapid capital accumulation leaves little room for productivity growth

Average annual TFP growth, NIEs

	Hong Kong (1966–1991)	Singapore (1966–1990)	South Korea (1966–1990)	Taiwan (1966–1990)
Economy*	2.3	0.2	1.7	2.1
Manufacturing#	NA	−1.0	3.0	1.7
Other industry	NA	NA	1.9	1.4
Services	NA	NA	1.7	2.6
Private sector	NA	NA	NA	2.3

Comparative TFP growth, major Western and Latin American economies

| Country	Period	Growth	Country	Period	Growth
Canada	1960–1989	0.5	Brazil	1950–1985	1.6
France	1960–1989	1.5	Chile	1940–1985	0.8
Germany	1960–1989	1.6	Mexico	1940–1985	1.2
Italy	1960–1989	2.0	Brazil (M)	1960–1980	1.0
Japan	1960–1989	2.0	Chile (M)	1960–1980	0.7
United Kingdom	1960–1989	1.3	Mexico (M)	1940–1970	1.3
United States	1960–1989	0.4	Venezuela (M)	1950–1970	2.6

Export orientation did not automatically imply trade openness, and many economies employed protectionist measures during liberalization stages

Trade openness by region, 1960-2016
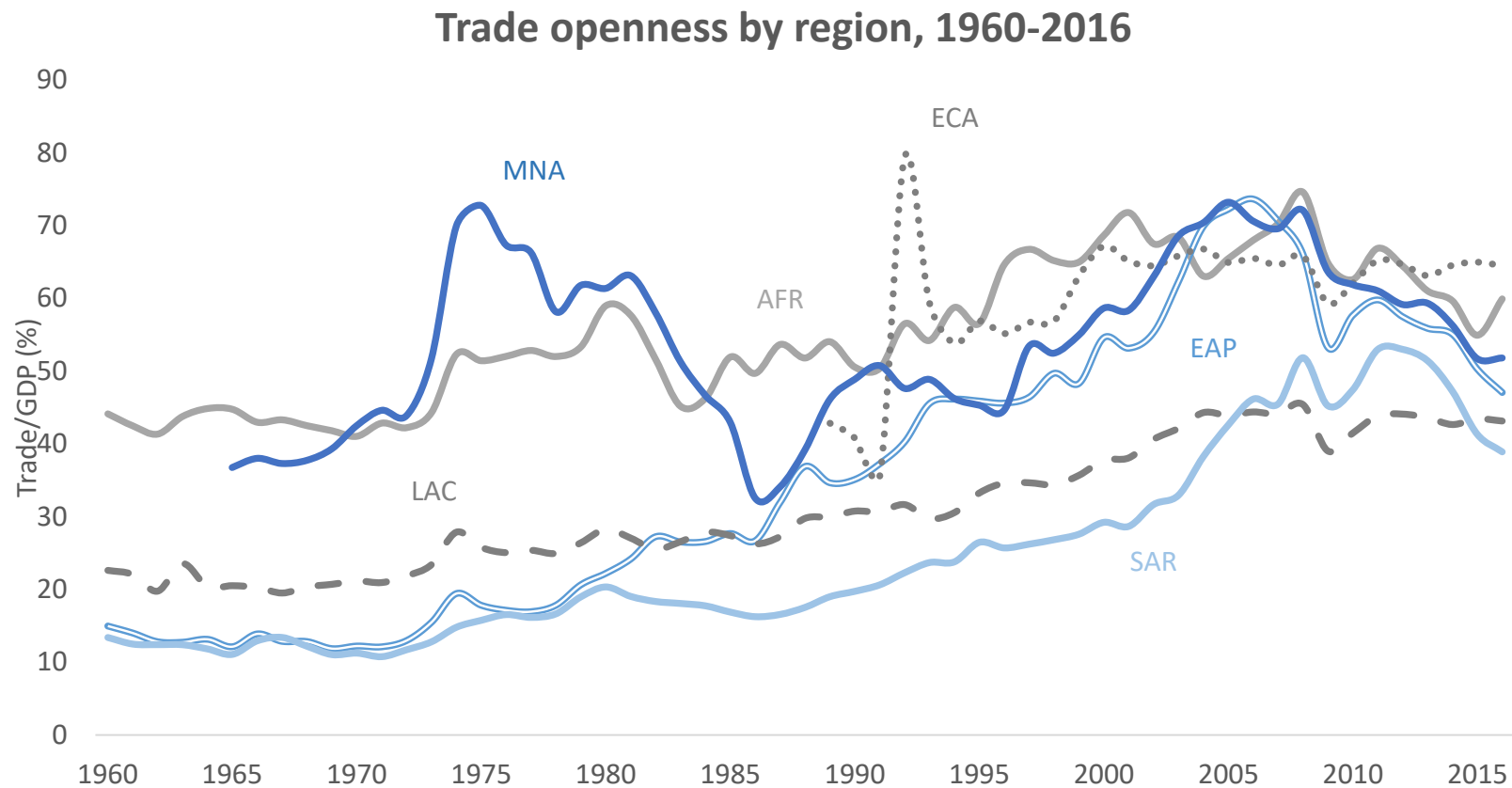
Source: Author's calculations, from World Bank (2017).

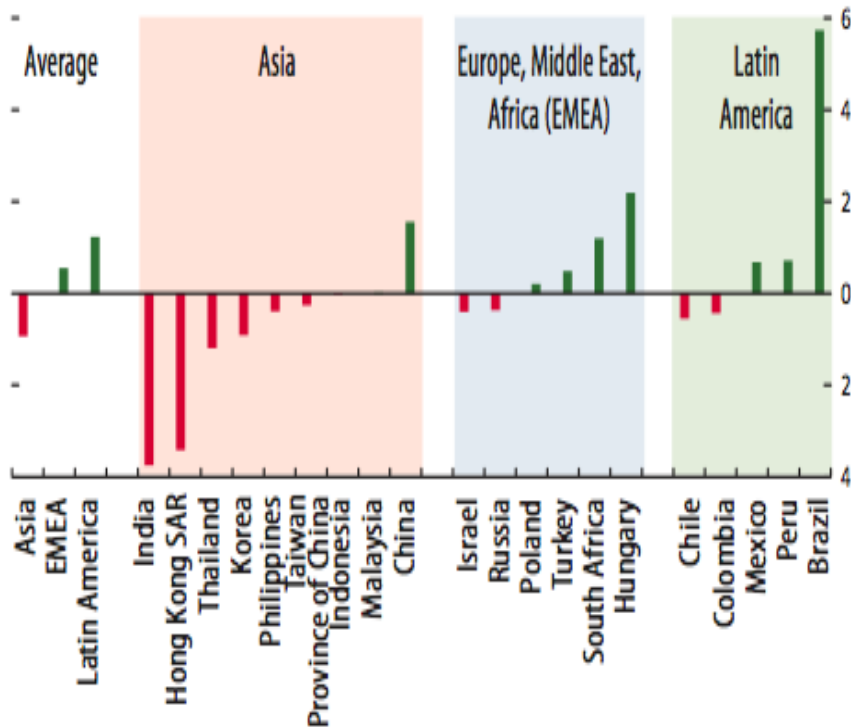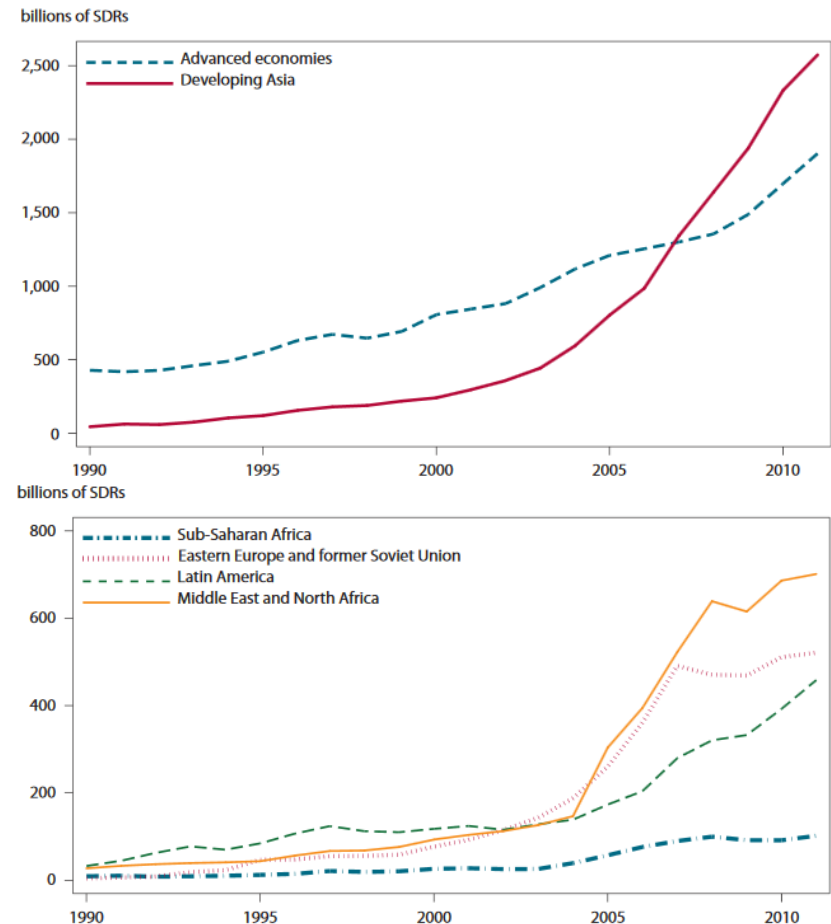# The exception is among NIEs and Japan, which have maintained a tradition of openness for a long time
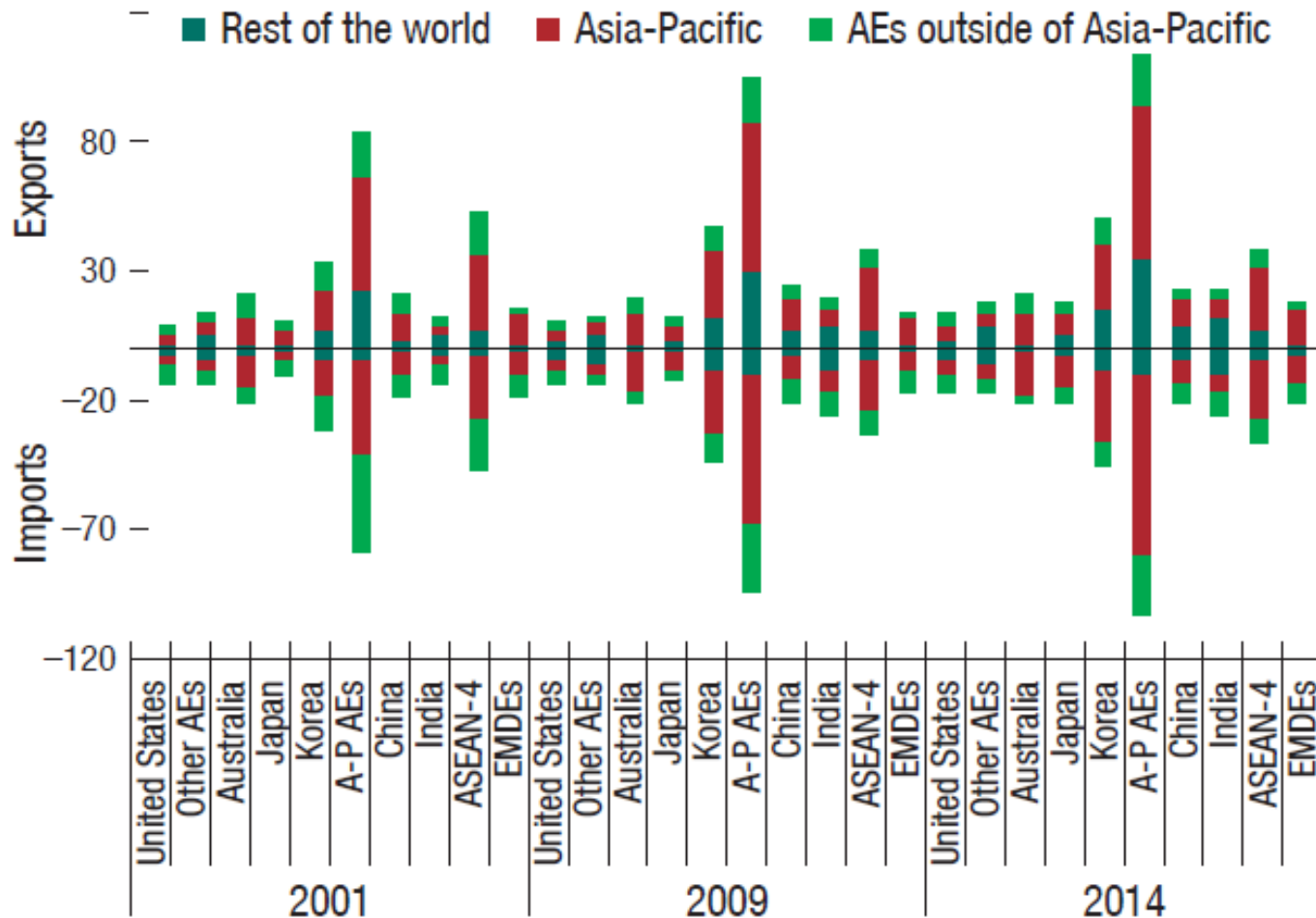
Asian economies have routinely intervened in capital markets to affect interest or exchange rates

Negative or artificially-suppressed low real policy rates, 2011

Manipulated or artificially-weak real exchange rates, 1990–2011

A Comparative View of Asia II

Source: https://youtu.be/YgGQmq9fJ6I

A Comparative View of Asia II

A history of world GDP
Percentage of total, 1990 $ at PPP*

Legend: China, India, Japan, US, France, Germany, Italy, Britain

Years: 1, 1000, 1500, 1600, 1700, 1820, 70, 1900, 13, 40, 70, 2008

Sources: Angus Maddison, University of Groningen; *The Economist*

*Purchasing-power parity
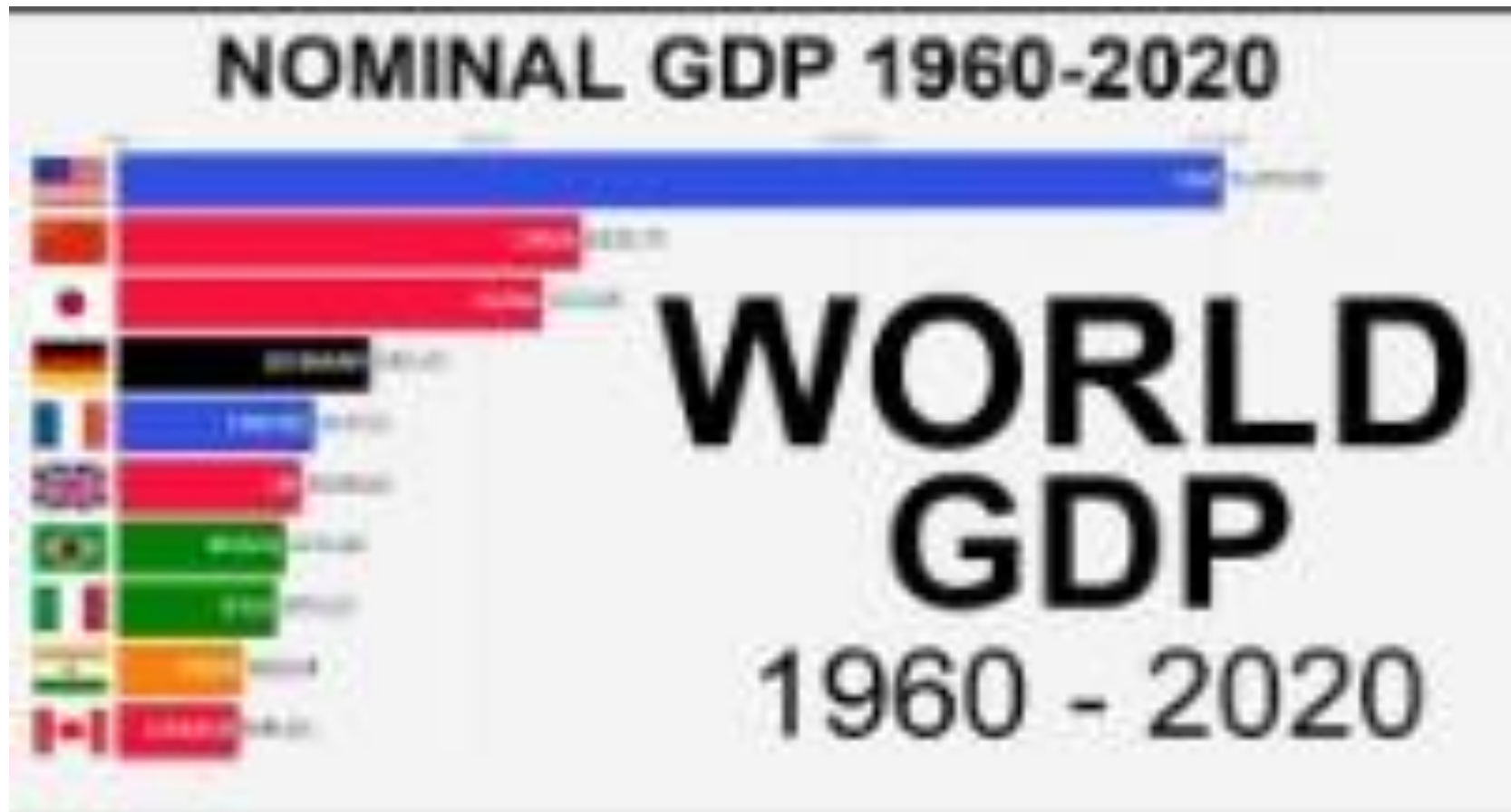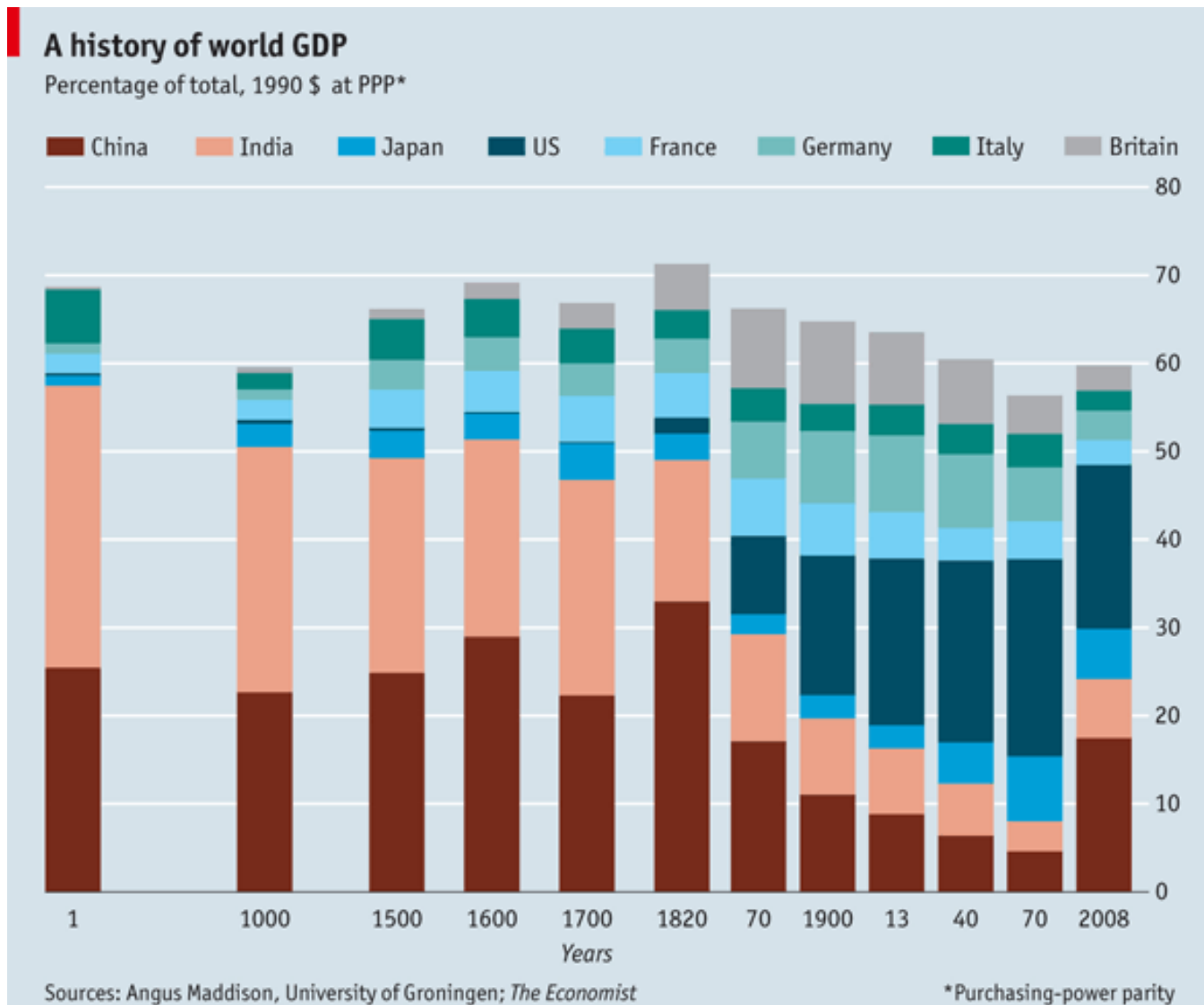
A Comparative View of Asia III

**Distribution of world output, 2010
(Total: $4.6 tn 2005 USD)**

**Distribution of world output, 2030
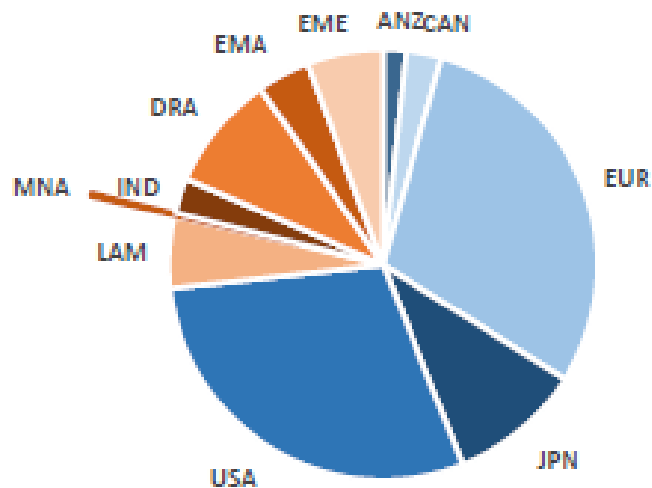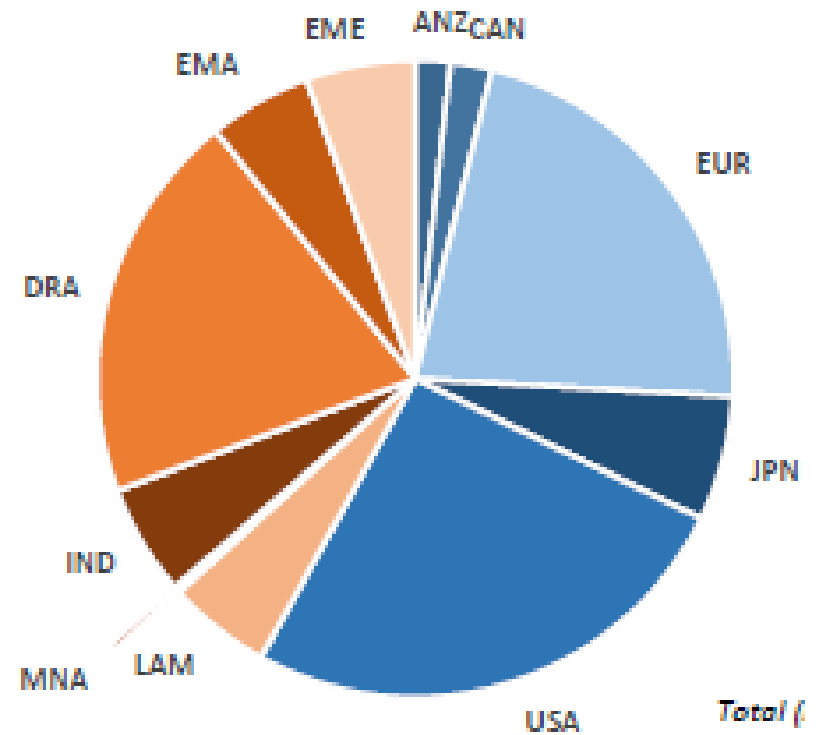(Total: $7.6 tn 2005 USD)**

A Comparative View of Asia IV

The world's economic centre of gravity*

As China has regained economic leadership, the centre is now retracing its footsteps towards the east

Japan's economic boom made it the second-largest economy in the world, pulling the centre north

European industrialisation and America's rise drew the economic centre of gravity into the Atlantic

In 1AD China and India were the world's largest economies

CHINA

2000 2010 2025
2018
1950 1800
1980 1900 1850
1960 1600
1AD

*The economic centre of the globe is calculated using an average of countries' locations weighted by their GDP

A Comparative View of Asia V

COVID-19 fiscal expenditure packages, selected G7, BRIC, and ASEAN economies, 2020
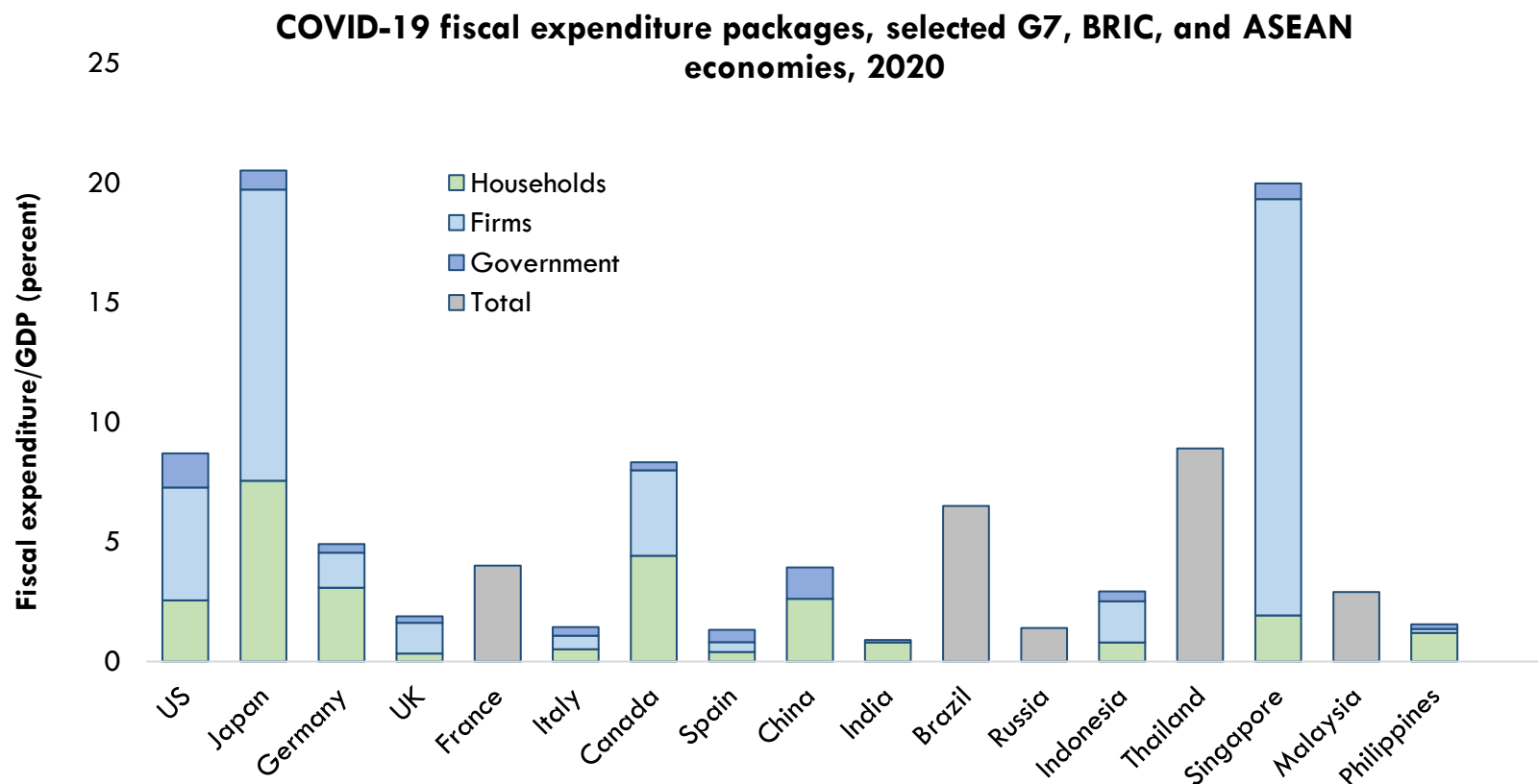
Source: Author's calculations, from national authorities and IMF.

Notes: Spending only include expenditures at the general government/federal level and excludes local/state spending. Household share includes income supplements, food safety net, and unemployment and other social security payouts; firm share includes loans, grants, job support, and tax holidays (including to the self-employed sector), but excludes guarantees; government share includes healthcare system, transfers to state/local authorities, and international assistance. GDP data rely on latest year available (usually 2019). Gray bar indicates detailed breakdown not available.

A Comparative View of Asia VI

Policy rates, selected DM, 2010–2020
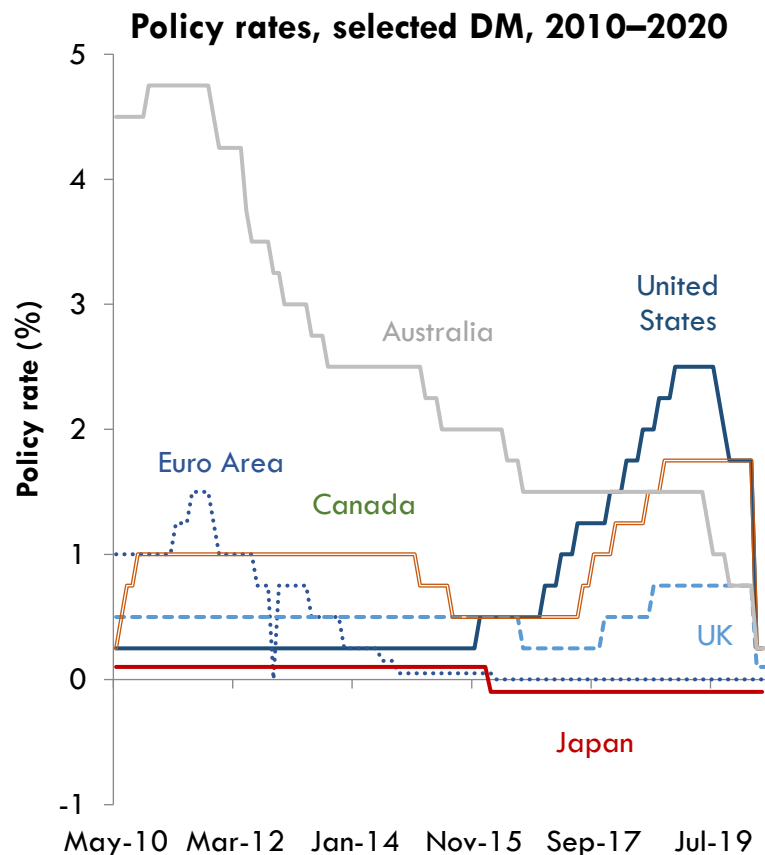
Source: Author's compilation, from Central Banks/Datastream.
Notes: Official central bank policy interest rates. Declared central bank
Inflation targets differ (CAN: 2 +/- 1%; EUR: < 2%; GBR, JPN, USA: 2%

Policy rates, selected EM, 2010–2020
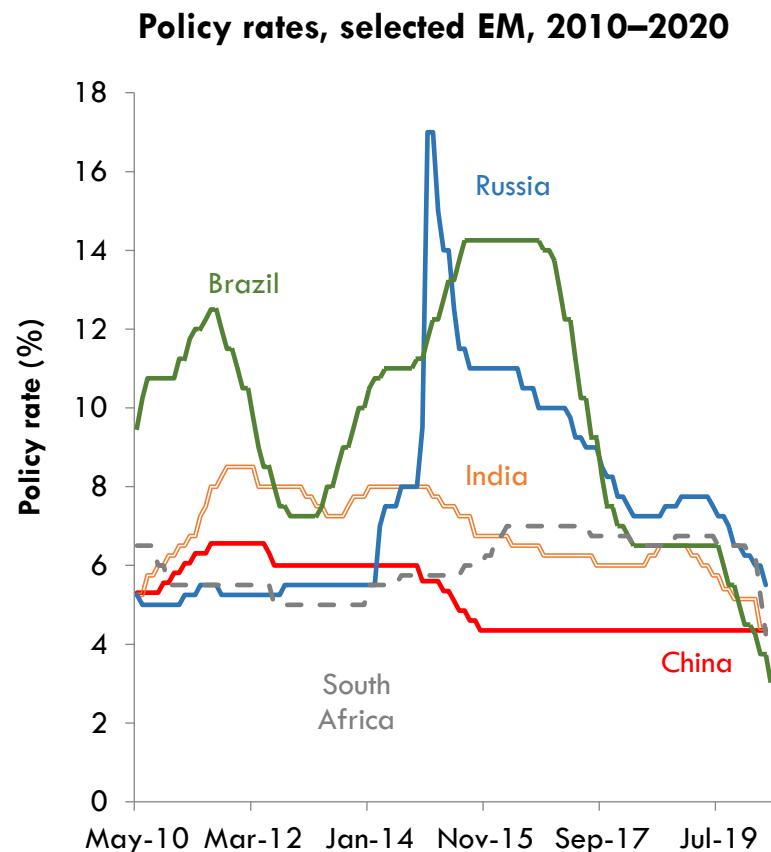
Source: Author's compilation, from Datastream.
Notes: Official central bank policy interest rates. Declared central bank
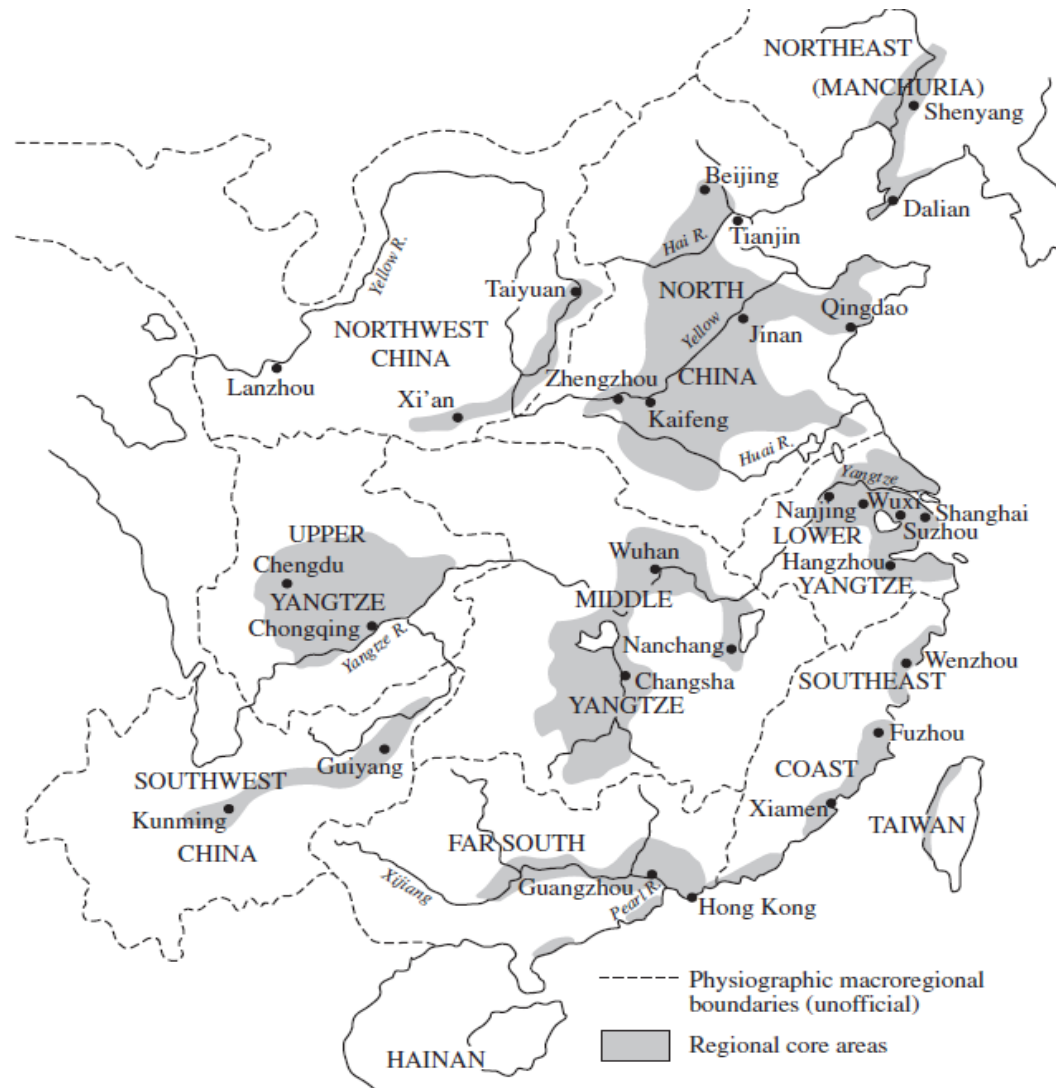inflation targets differ (BRA: 4.5 +/- 2; CHN, RUS: 4; IND: 6; ZAF: 3-6).

Lecture 1a

The Chinese Economy

The Economic Geography of China

China's evolving borders

A Brief Economic History of China I

- China is one of the oldest continuing civilizations in the world
    - First established in the Yellow River valley of the Ordos bulge
    - Settlements expanded into a number of ancient major kingdoms (legendary Xia, Shang, Zhou), before unification into an imperial state under Qin dynasty (221 BCE) and consolidation under Han
    - Golden Age (Tang–Song) followed by external conquests (Yuan, Qing)
    - Unified dynastic rule interspersed with periods of greater distension, such as Warring States (*zhànguó*) and 3 Kingdoms (*sānguó*) periods
    - Circularity and continuity of continues to pervade modern Chinese worldviews

- In spite of the civilization's rich sociocultural history, China's steady economic progress did not result in takeoff into modern economic growth
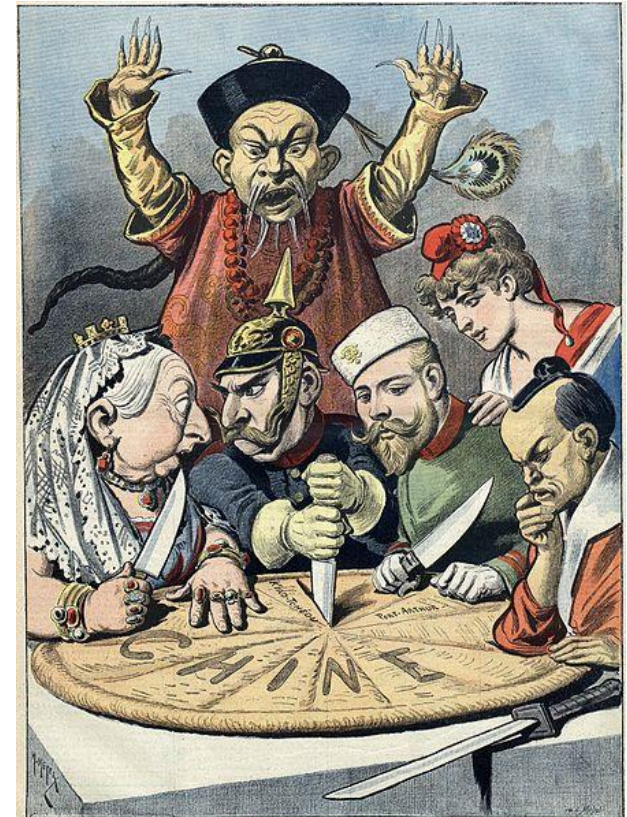
A Brief Economic History of China II

- Southern Song–Qing Period (1127–1911)

  - Highly productive agricultural system enabled rapid population growth relative to rest of world

  - Commercialized rural economy with Pearl-Yangtze economic centers

  - Traditional economy period was characterized by:

    - Sophisticated institutional arrangements

    - Competitive markets for outputs and inputs

    - Small-scale, "bottom-heavy" economy with flexible allocation of resources

- By late Qing, diminishing returns set in with traditional technologies, and corruption compromised meritocracy

A Brief Economic History of China III

- Domestic weakness fed by internal disruptions (*nèiluàn)*
  - Taiping Rebellion
  - Boxer Uprising against foreign influence ended with suppression, occupation, and looting
- Failed responses to external aggression (*wàihuàn*)
  - China traditionally ran large trade surpluses with outside world, with silk/tea/porcelain exports financed by silver inflows
  - British refusal to cease exports of Indian-grown opium led to two Opium Wars and concessions to the West
  - Japanese desire for resources led to two Sino-Japanese Wars and puppet appointment of deposed Puyi as Manchukuo emperor
- Events of the "Century of Humiliation" (*bǎinián guóchǐ*) continue to shape Chinese perceptions of international relations till this day

Although China did not completely fall under colonial control, it was forced to relinquish territories to Imperial powers

A Brief Economic History of China IV

- Republican Period (1912–1949)
  - Early industrialization under Nationalists (*Kuomintang*)
    - Light industry with foreign investment in Treaty Port enclaves with rapid growth through imitation
    - Japanese government-led heavy industry in Manchuria
  - Steadily-rising Japanese influence eventually erupted in invasion of China, and reorientation of the economy toward military objectives
  - Concurrently, the communist insurgency resulted in civil war, which ended with the flight of Nationalists to Taiwan
  - Efforts to finance the war resulted in hyperinflation (and default) by the end of the conflict

A Brief Economic History of China V

- While the beginning of the Republican period saw important moves toward modernization, the slow pace ultimately set the stage for the socialist takeover

  - Chinese experience with foreign aggression left the country suspicious of Western institutions and worldviews

  - Wartime resource mobilization primed the economy for centralized planning under a socialist industrialization strategy

  - Neglect of traditional economy excluded vast majority of the Chinese economy from development

A Brief Economic History of China VI

- Communist Period (1950–1978)
  - "Big Push" industrialization strategy initially successful
    - Rapid, sustained increase in investment with command-and-control planning via input-output tables
    - Prioritization of heavy industries with government directing state-owned enterprises serving domestic markets
  - Great Leap Forward led to regression in industrialization process
    - Intensification of ideological atmosphere, with persecution of intellectuals from prior "Hundred Flowers" period of relative progressivity
    - Initial growth surge became unsustainable due to rampant misallocation, eventually leading to widespread famine in the interior
  - Cultural Revolution further eroded process of development
    - Launched by Mao's call for student Red Guards to overthrow entrenched Communist Party leadership
    - Destruction of human capital both already-accumulated (teachers) and in the process of being accumulated (students)
    - Later civil conflict further disrupted economic progress, especially inland

Excess mortality due to famine conditions, 1961–62

- Largest recorded famine in history

- Estimates of excess deaths amounted to between 25–30 million

- About 30 million births were postponed due to malnutrition and shortage

Over 10% of pop. ■
4%–6% of pop. ▧
2%–4% of pop. ▢
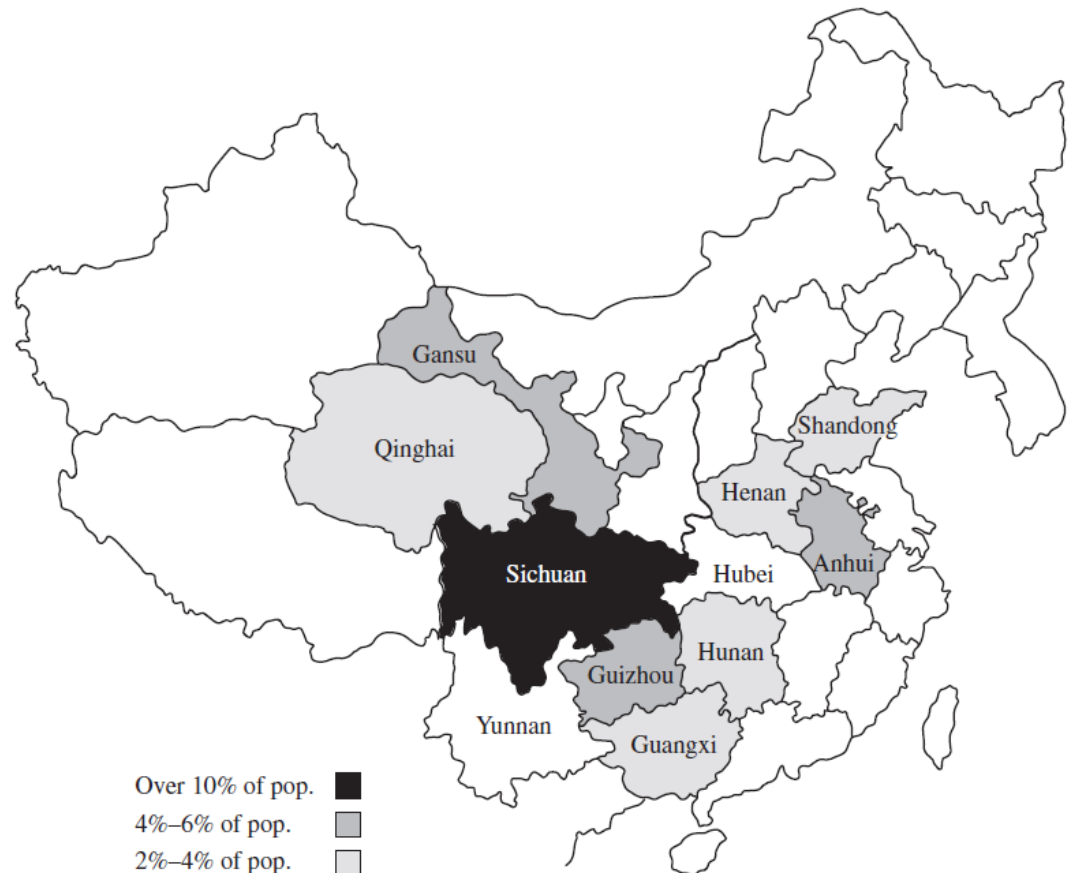
Backyard smelters in Zhongwei County, Ningxia

The Cultural Revolution led to public denunciations of teachers and student-led violence perpetrated by Red Guards

Growth of investment, 1953–1978

- Steady growth in investment rates as the economy has developed
- Significant volatility, with peaks followed by retrenchment, largely due to policy

Disruption due to political persecution, 1966–1971

- Early stages of Revolution were characterized by power seizures, followed by military intervention (to quell unrest)

- A second stage, led by authorities, involved revolutionary committees that seized power and induced civil government collapse
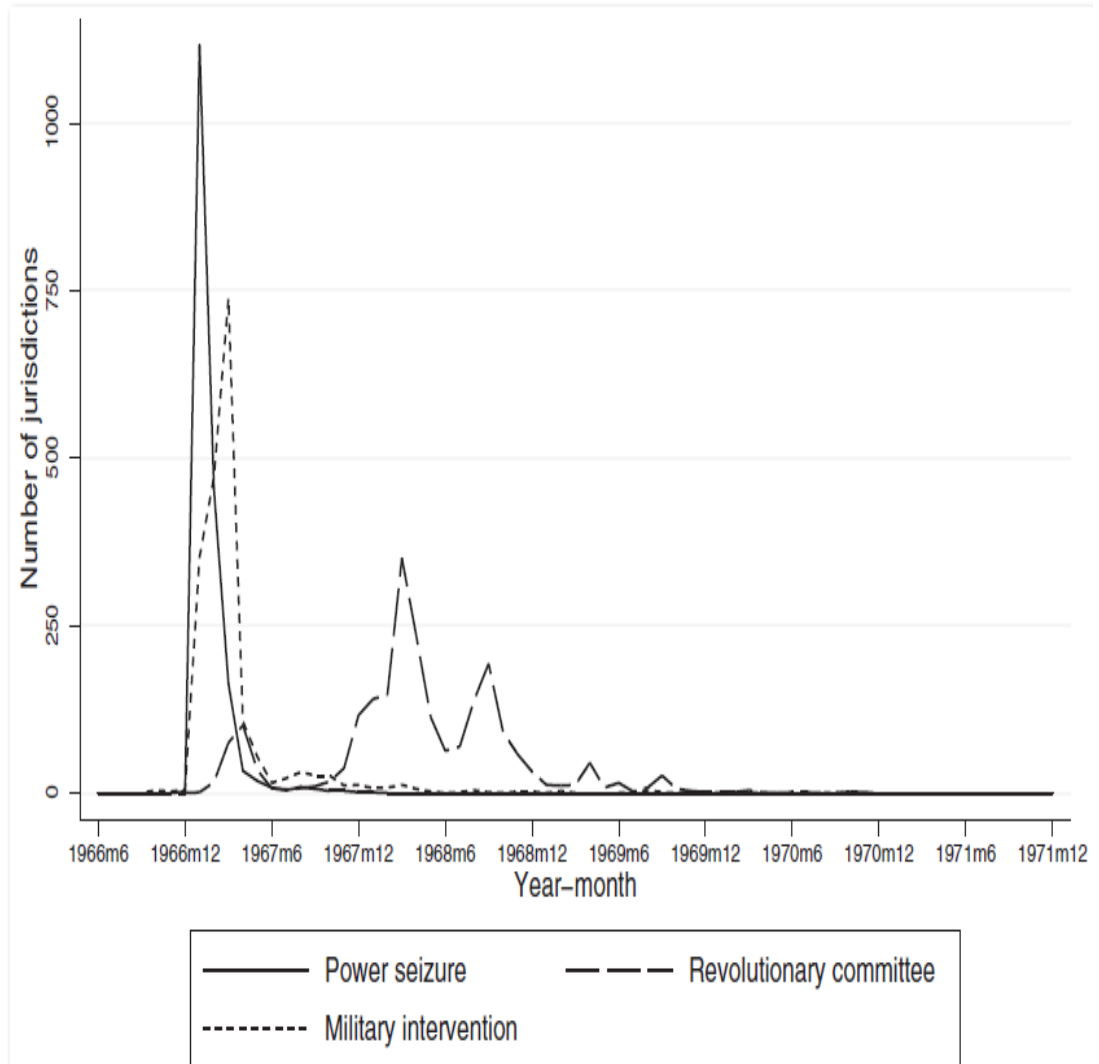
A Brief Economic History of China VII

- Definitive economic reform would only occur after Mao's death, which enabled a breakaway from the command economy

  - The stop-start record under socialist command was attributable to the difficulty of successfully coordinating resource allocation in the absence of prices and incentives

  - The pursuit of heavy industry and productive agriculture led to a neglect in the development of the service sector, especially retail commerce

  - Socialism did build a human capital base through expansion of education and healthcare, although ideological pursuit led to setbacks in the accumulation of human capital

Lecture 1b

The Solow Growth Model and Growth Accounting

Production I

- Production function

$$Y = f(K, AL)$$

Typically, we assume a constant returns to scale, labor-augmenting technology, such as that of a Cobb-Douglas production function
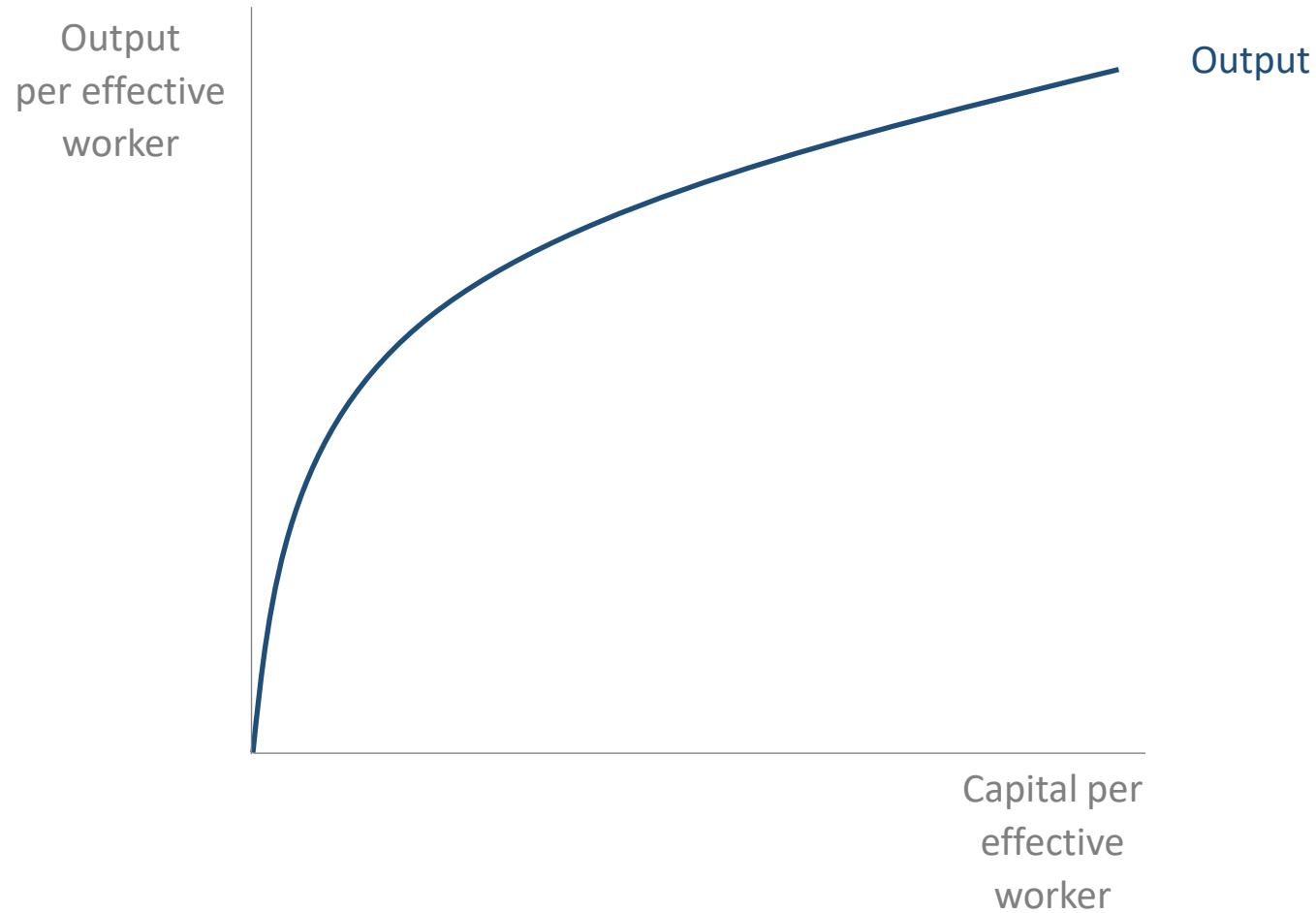
$$Y = K^\alpha (AL)^{1-\alpha}$$

With CRS, we can further rewrite the production function in a more convenient *intensive form*

$$\frac{Y}{AL} = f\left(\frac{K}{AL}, 1\right)$$

For the functional form above, this is

$$y \equiv \frac{Y}{AL} = \left(\frac{K}{AL}\right)^\alpha \equiv k^\alpha$$

Production II

Saving and Capital Accumulation I

- Capital accumulation

$$K_{t+1} = (1 - \delta)K_t + I_t$$

- Saving

$$S_t = \sigma Y_t$$

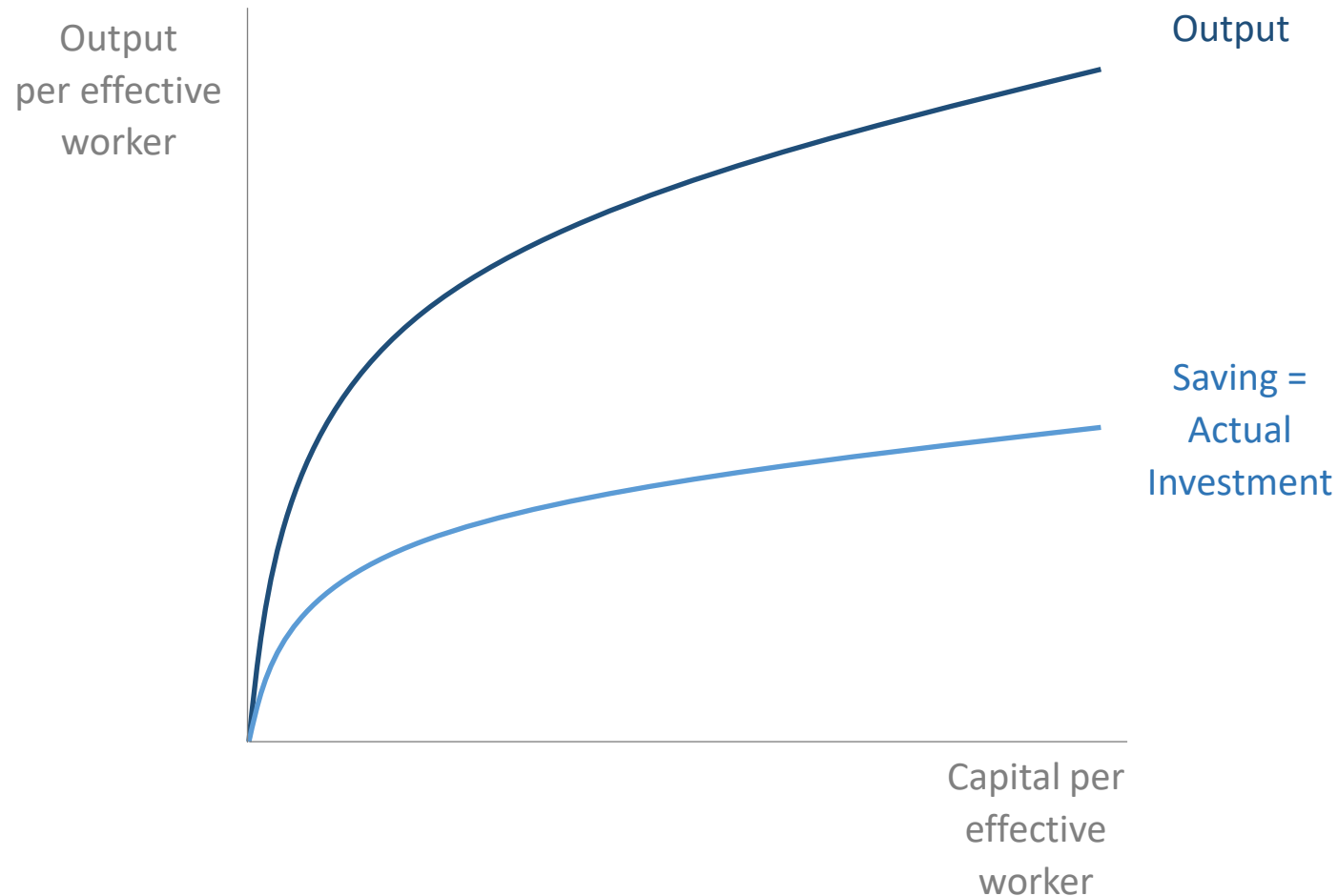In equilibrium, S = I, and so we can rewrite the above in intensive form as well:

$$\frac{K_{t+1}}{AL} - \frac{K_t}{AL} = \sigma \frac{Y_t}{AL} - \delta \frac{K_t}{AL}$$
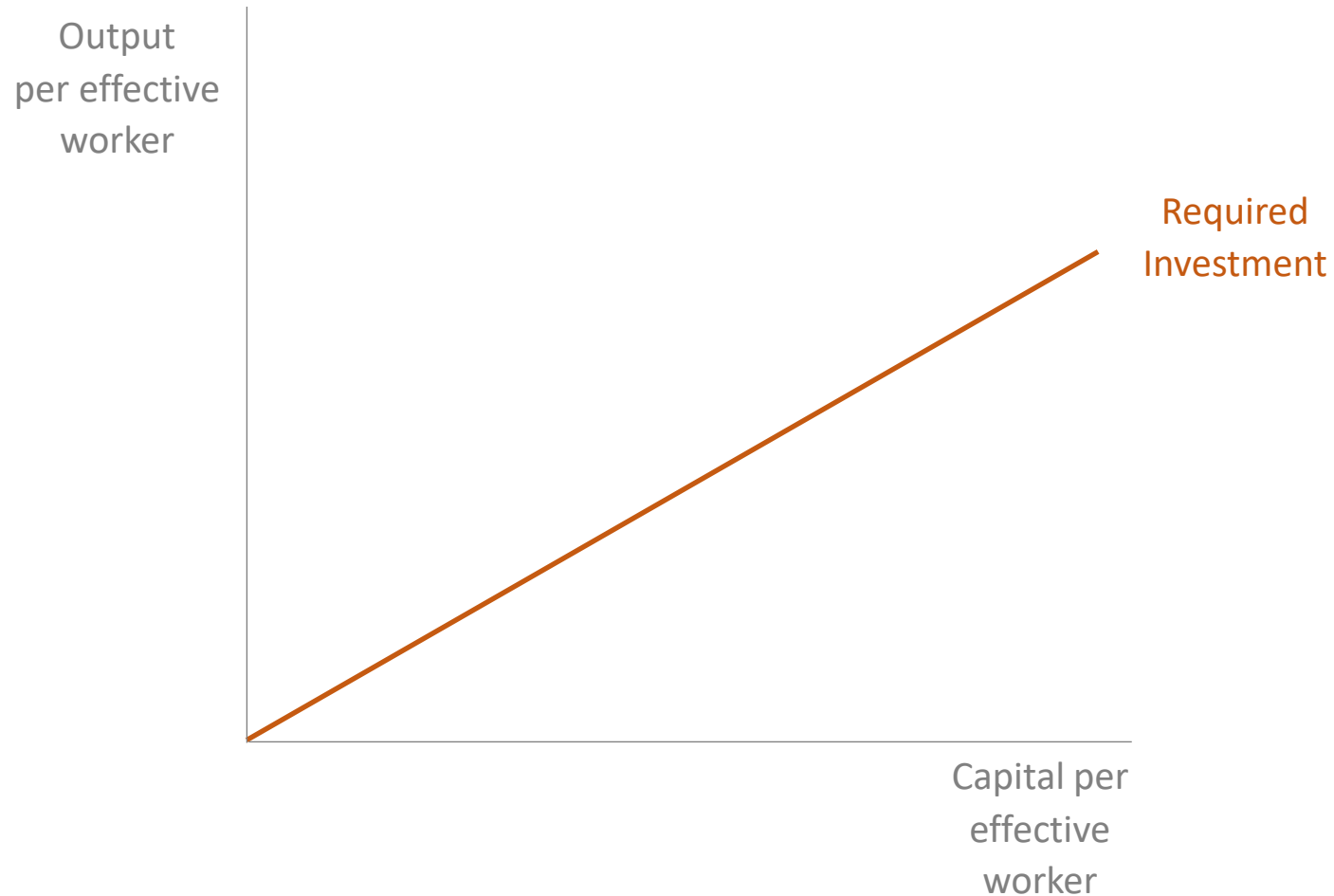
Capital   Investment   Depreciation
accumulation

In the steady state, $K_{t+1} = K_t$, so we obtain:

$$\sigma y = \delta k$$

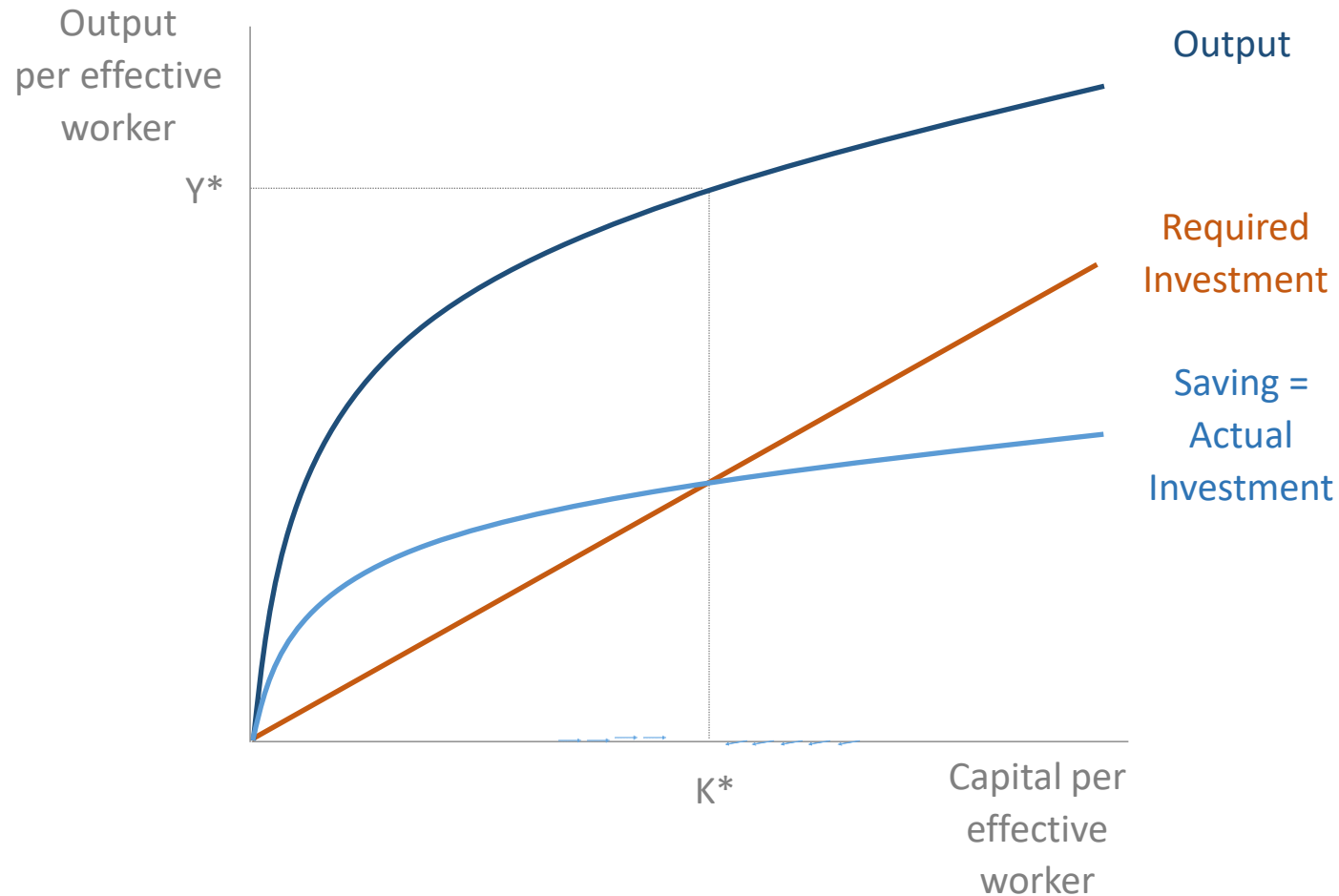# Saving and Capital Accumulation II

Saving and Capital Accumulation III
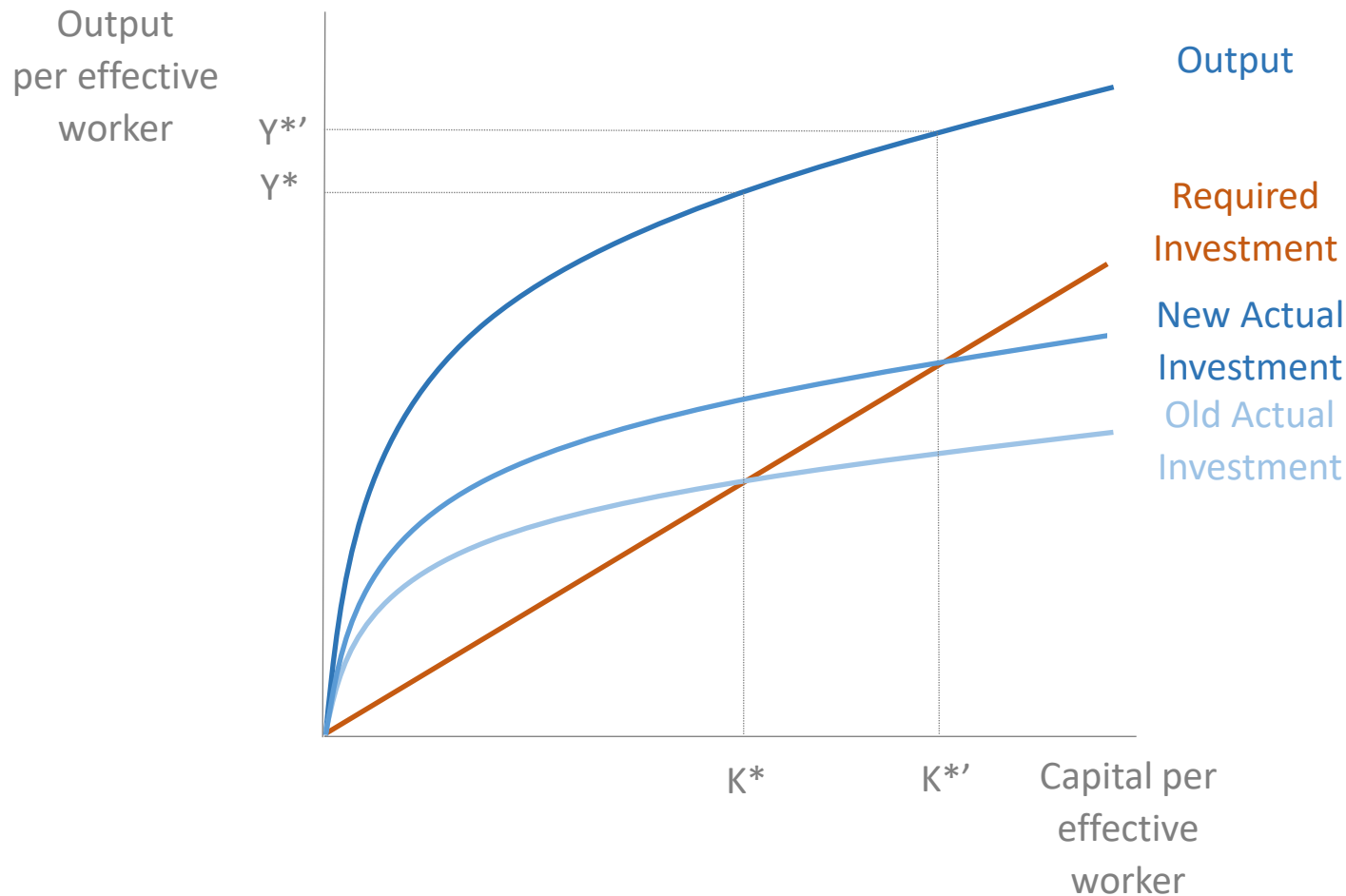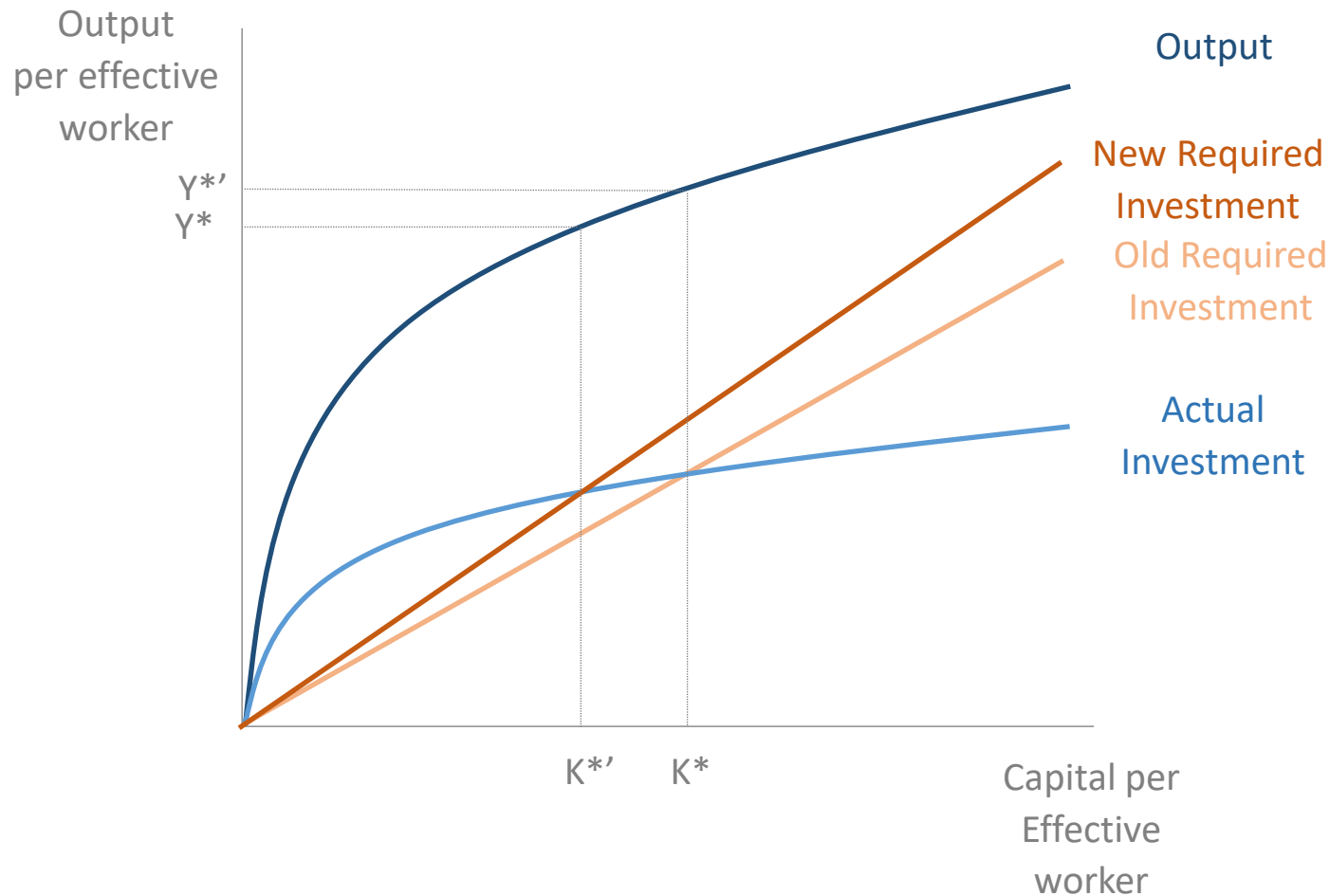
Steady-State Equilibrium

Comparative Dynamics I
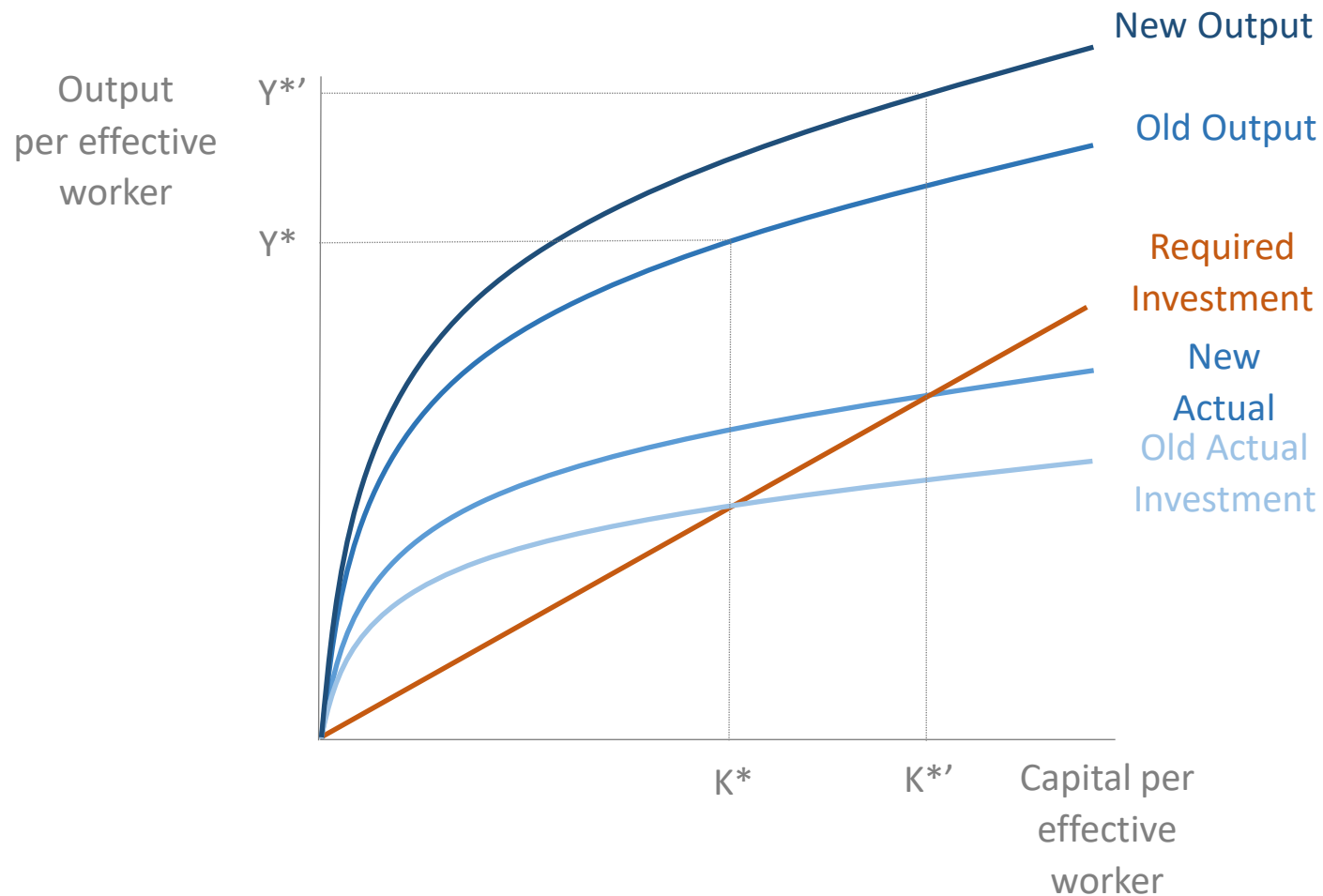
- Increase in saving/investment

Comparative Dynamics II

• Increase in labor force with *no* offsetting increase in saving

Comparative Dynamics III

- Increase in technology

Comparative Dynamics IV

- Increase in labor force *with* corresponding increase in saving
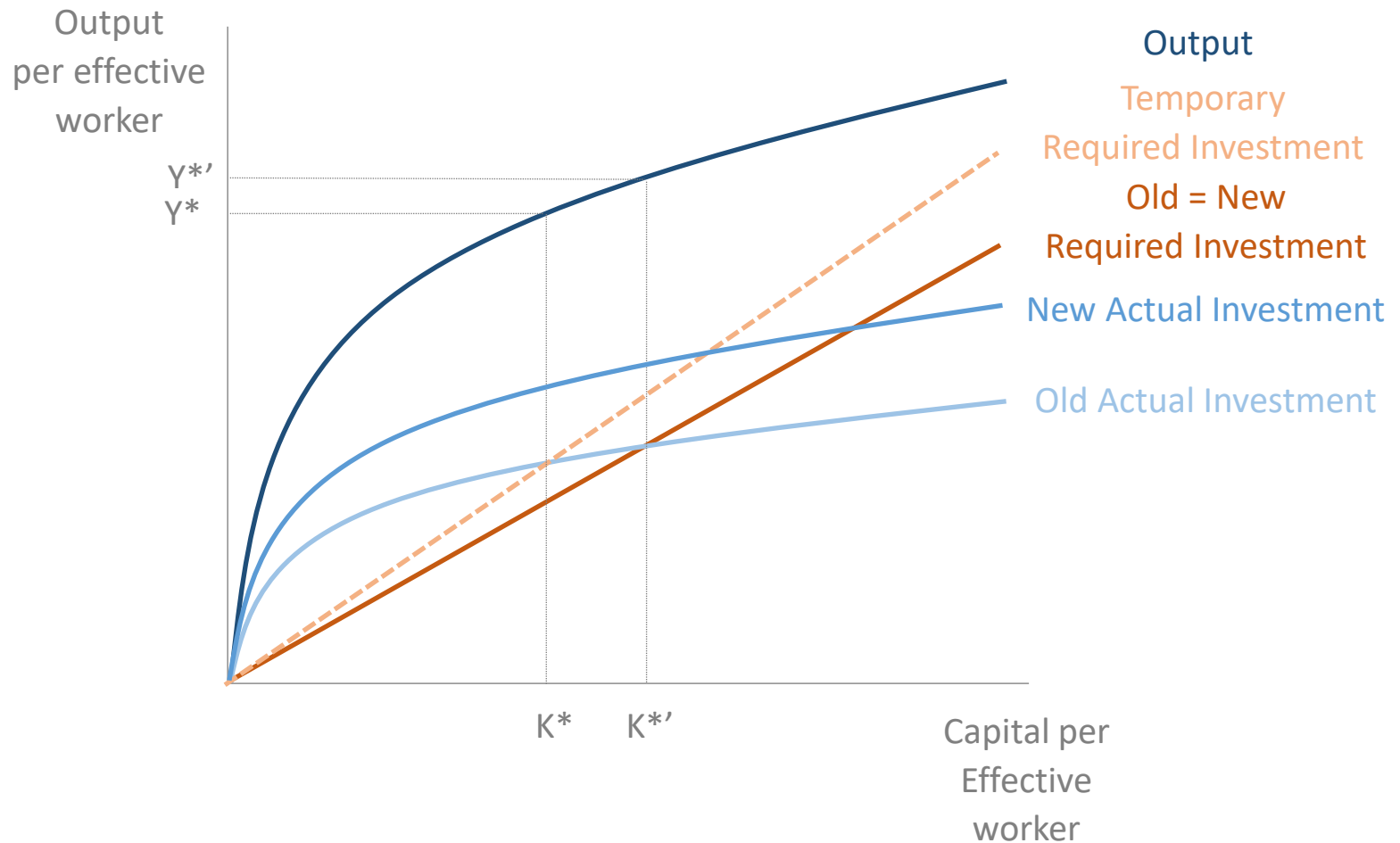
Accounting I

- Recall our production function

$$Y = f(A, K, L)$$

  With Cobb-Douglas production

$$Y = A \cdot K^{\alpha} L^{1-\alpha}$$

- Now, take the differential with respect to time, and with a couple of manipulations

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + s_K \frac{\dot{K}}{K} + s_L \cdot \frac{\dot{L}}{L}$$

  Where the capital/labor shares are given by

$$s_K \equiv r \cdot \frac{K}{Y}, s_L \equiv w \cdot \frac{L}{Y}$$

Accounting II

- Growth is therefore a combination of:

    - Capital contribution, $s_K \dfrac{\dot{K}}{K}$

    - Labor contribution, $s_L \cdot \dfrac{\dot{L}}{L}$

    - TFP contribution, $\dfrac{\dot{A}}{A} = \dfrac{\dot{Y}}{Y} - s_K \dfrac{\dot{K}}{K} - s_L \cdot \dfrac{\dot{L}}{L}$

- This is **growth accounting:** we are accounting for the different factor contributions to growth

Accounting III

- But this characterization of growth may be incomplete, since it does not account for quality: especially *labor* quality

- Rewrite

$$Y = f(A, K, H)$$

With Cobb-Douglas production

$$Y = A \cdot K^{\alpha} H^{1-\alpha}$$

- Add human capital production

$$H = f(S, L)$$

With Mincerian educational production

$$H = H_0 \cdot e^{\phi S} \cdot L$$

Accounting IV

- Labor should also allow for variations in demographics and the business cycle

$$L = (\underbrace{\rho \cdot \overbrace{\varepsilon}^{\text{Employment}}})_{\text{Participation}} \cdot \underbrace{P}_{\text{Working-age population}}$$

- Putting these together,

$$H = H_0 e^{\phi S} \cdot (\rho \varepsilon P)$$

- Taking differentials again, obtain an augmented growth accounting expression

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + s_K \frac{\dot{K}}{K} + s_L \left[\frac{\dot{S}}{S} \cdot S + \frac{\dot{\rho}}{\rho} + \frac{\dot{\varepsilon}}{\varepsilon} + \frac{\dot{P}}{P} \right]$$

Saving and Capital Accumulation, Extended

- Capital accumulation

$$K_{t+1} = (1 - \delta)K_t + I_t$$

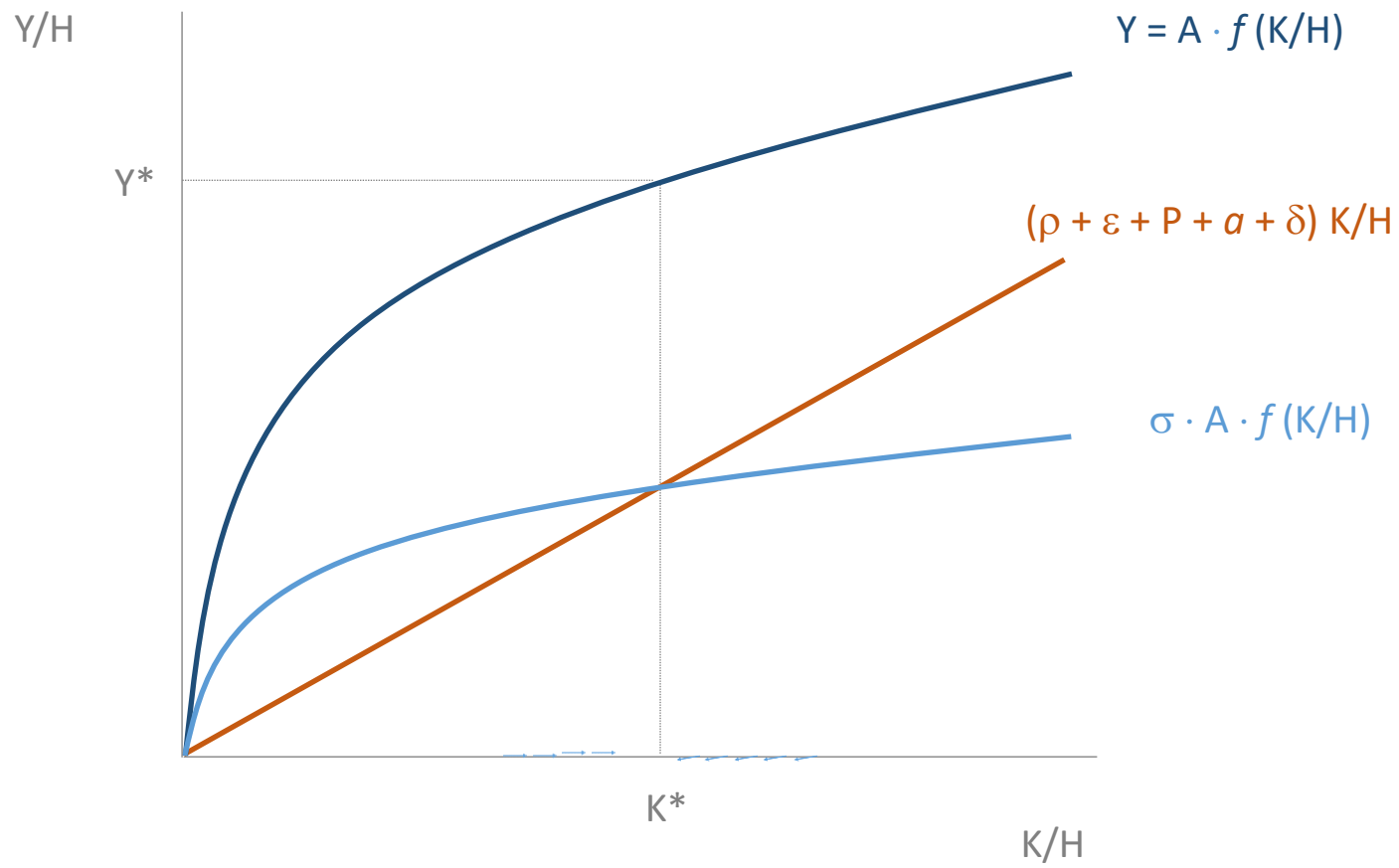- Saving, as before, is

$$S_t = \sigma Y_t$$

In equilibrium, S = I, and so we can rewrite the above:

$$K_{t+1} - K_t = \sigma Y_t - \delta K_t$$

Capital accumulation   Investment   Depreciation

- But since we now allow *H* to includes changes to technology and human capital, required investment in the steady state now needs to account for these changes, so that

$$\sigma Y_t = (\rho + \varepsilon + P + a + \delta)K_t$$

Steady-State Equilibrium, Extended

Y/H

$Y = A \cdot f(K/H)$

Y*

$(\rho + \varepsilon + P + a + \delta) \, K/H$

$\sigma \cdot A \cdot f(K/H)$

K*

K/H

Measuring Variables I

- Output (Y)
  - Real GDP in constant dollars

- Physical capital (K)
  - <u>Historical</u>: Use perpetual inventory method and calculate from gross fixed capital formation
  - <u>Projections</u>: Assume: (a) fixed capital-output ratio; (b) fixed investment rate

- Human capital (H)
  - <u>Historical</u>: Educational attainment of population > 15 years
  - <u>Projections</u>: Barro-Lee schooling forecasts

- Labor (L)
  - <u>Working-age population (P)</u>: Population 16–64 years
  - <u>Participation rate (ρ)</u>: Share of working-age population in labor force
  - <u>Employment (ε)</u>: (1 – unemployment rate), or infer from cyclical trends
  - <u>Projections</u>: Population from UN, participation from ILO

Measuring Variables II

- TFP (A)

    - <u>Historical</u>: Solow residual

    - <u>Projections</u>: (a) Simple average of full history; (b) Average of partial history; (c) Loglinear trend; (d) Weighted Least Squares regression
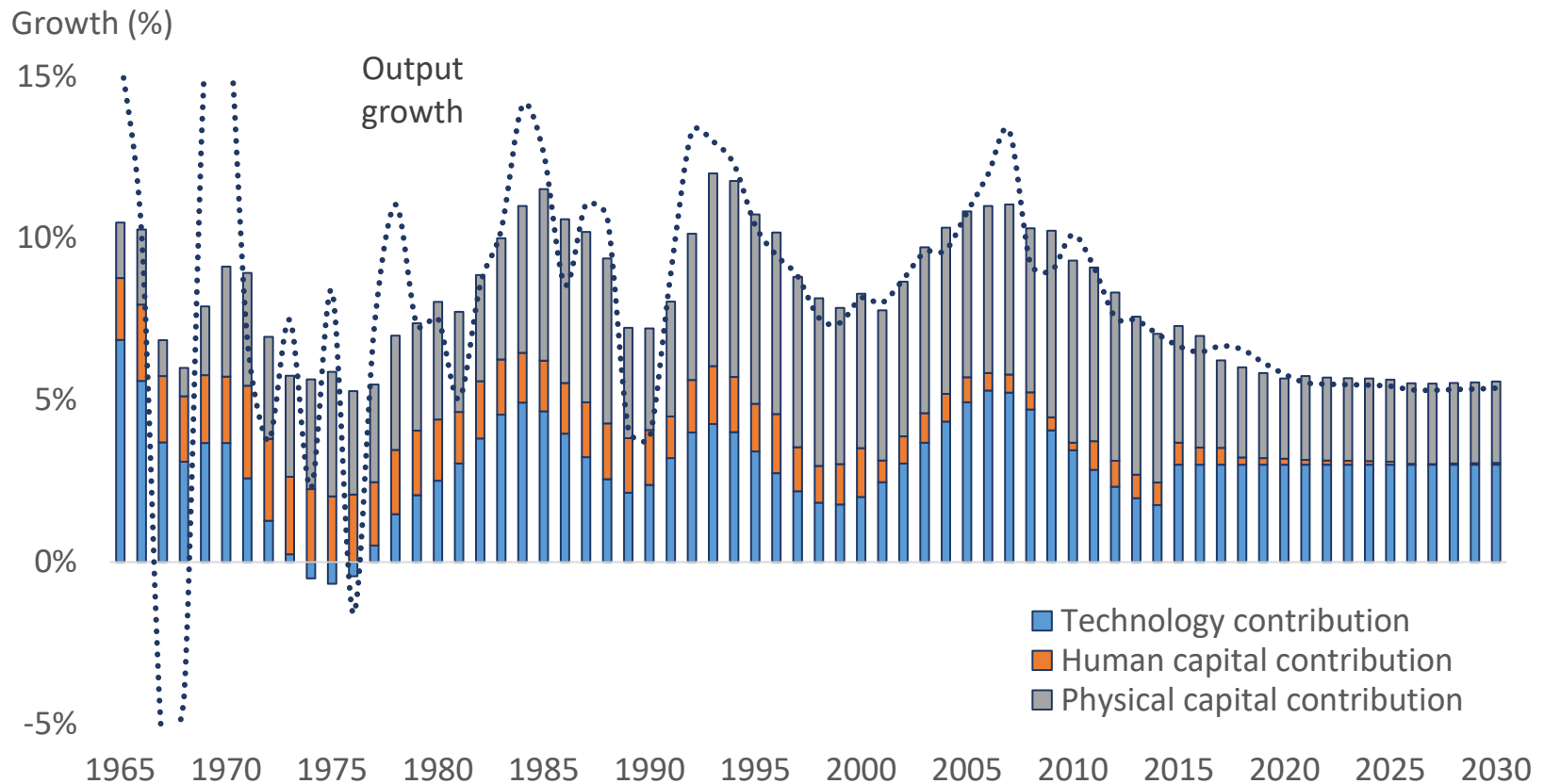
Measuring Parameters

- Factor shares (s_K, s_L)

$$Y = \underbrace{\pi}_{\text{Profit}} + \overbrace{W}^{\substack{\text{Wage} \\ \text{bill}}} + \underbrace{M}_{\substack{\text{Mixed} \\ \text{income}}} + \overbrace{\tau}^{\text{Taxes}}$$

  - M given to W (all mixed income is informal labor)

  - Impute proportionately to W and π

  - Scale up wage bill by ratio of formal/informal labor force
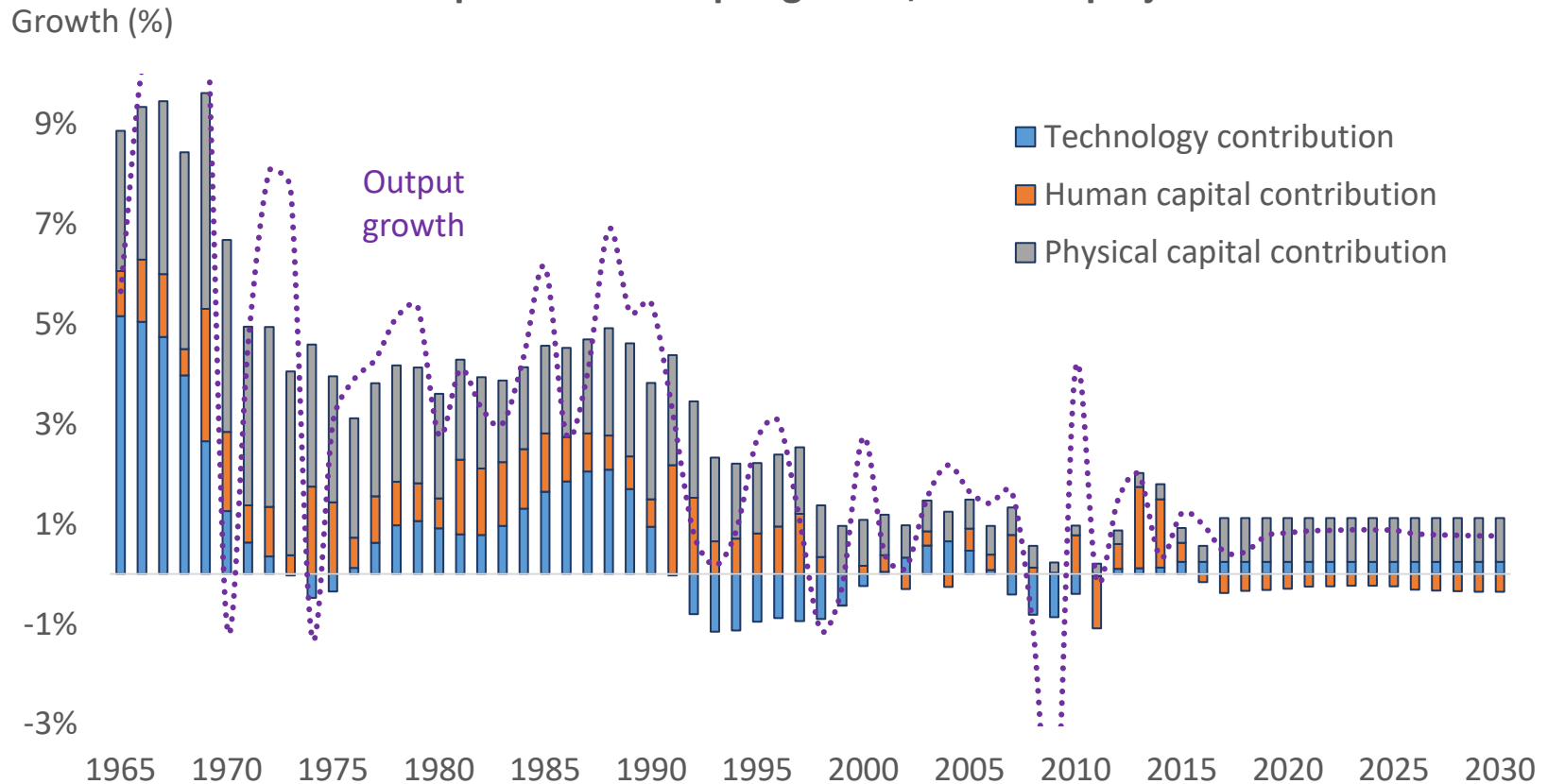
- Education returns (ϕ)

Example: China

ESSEC BUSINESS SCHOOL

Decomposition of output growth, baseline projection

Growth (%)

Output growth

- Technology contribution
- Human capital contribution
- Physical capital contribution

Source: Authors' calculations, from Barro & Lee (2015, 2016), IIASA (2010), ILO (2014), UN (2013, 2015), World Bank (2017)

Example: Japan

Decomposition of output growth, baseline projection

Growth (%)

- Technology contribution
- Human capital contribution
- Physical capital contribution

Output growth

Source: Authors' calculations, from Barro & Lee (2015, 2016), IIASA (2010), ILO (2014), UN (2013, 2015), World Bank (2017)