ECO 403 – L0301
Developmental Macroeconomics

Lecture 9
The Closing of the Model

Long-Term Economic Growth

- Long-term **growth** of developing countries depends on:
  - ➢ The **investment** rate
  - ➢ The growth of **exports**

- **Growth** is subject to three types of **constraints**:
  - ➢ The **foreign** constraint
  - ➢ The **productive capacity** constraint
  - ➢ The tendency to **overvaluation** constraint

- The **foreign** constraint
  - ➢ If $\theta = \theta_{ind}$, any **growth rate** will be sustainable regarding the **equilibrium** of the **balance of payment**
  - ➢ But the **currency** cannot become **overvalued** , i.e., there is an **exchange rate** constraint

Long-Term Economic Growth (cont'd)

- **Productive capacity** constraint
  - ➤ Long-run **growth** rate must be compatible with the **normal** level of **productive capacity** utilization (u_n)
  - ➤ If θ is appreciated, **investment** is encouraged and **productive capacity growth** rate is accelerated
  - ➤ Thus **productive capacity** constraint can be relaxed through variations in θ

- The **overvaluation** constraint
  - ➤ There is a **tendency** to chronic and cyclical **overvaluation** of the currency due to **Dutch disease** and/or excessive **capital inflows**
  - ➤ It's represented by the difference between θ_{ind} and θ_{cc} (or θ_{fd})

The Keynesian/Structuralist Growth Model

- Consider $\boxed{Q = vuK}$ where Q is output, $v = \dfrac{\overline{Q}}{K}$ is the output-capital ratio, $u = \dfrac{Q}{\overline{Q}}$ is the rate of capacity utilization, and K is the capital stock

- Therefore, $Q = \dfrac{\overline{Q}}{K} \dfrac{Q}{\overline{Q}} K$ and $\boxed{\Delta Q = vu\,\Delta K}$

- Gross investment is $I = \Delta K + \delta K$, where δ is the rate of depreciation of the capital stock
  - So $\boxed{\Delta K = I - \delta K}$

- Thus $\Delta Q = vu\,\Delta K = vu(I - \delta K)$ and if $u = u_n$ where u_n is the normal rate of capacity utilization

$$\boxed{\frac{\Delta Q}{Q} = vu_n\left(\frac{I}{Q} - \frac{\delta K}{Q}\right) = u_n\left(v\frac{I}{Q} - \delta\right)}$$

The Keynesian/Structuralist Growth Model (cont'd)

■ This model is characterized by the following set of equations:

$$g = u_n\{v\,[\vartheta(\theta, R(\theta) - r)] - \delta\}$$

$$\theta = \theta_{ind}$$

where θ_{ind} is the industrial equilibrium real exchange rate, $g = \frac{\Delta Q}{Q}$ is the rate of growth, r is the real cost of capital, and $\frac{I}{Q} = \vartheta(\theta, R(\theta) - r)$ is the rate of investment, where $\frac{I}{Q}$ is a function of θ and $R(\theta) - r$ (i.e., the expected net return on the investment)

Long-Run Equilibrium without Dutch Disease

$$g = u_n\{v\left[\vartheta(\theta, R(\theta) - r)\right] - \delta\}$$

$$\theta = \theta_{ind}$$

- Long-term **equilibrium** implies that **productive capacity** is growing at the same pace as **aggregate demand**
  - It implies $\theta = \theta_{ind}$

- The long-term **equilibrium** rate of growth ($\overline{g}$) is the **warranted** rate of **growth**
  - It implies that the economy's **productive structure** remains **constant** over time
  - Thus $\theta = \theta_{ind}$ implies $\overline{g} = g_{ind}$

Long-Run Equilibrium without Dutch Disease

$$\bar{g} = u_n \{v \left[\vartheta(\theta, R(\theta) - r)\right] - \delta\}$$

θ

θ_{ind}

g_{ind}

g
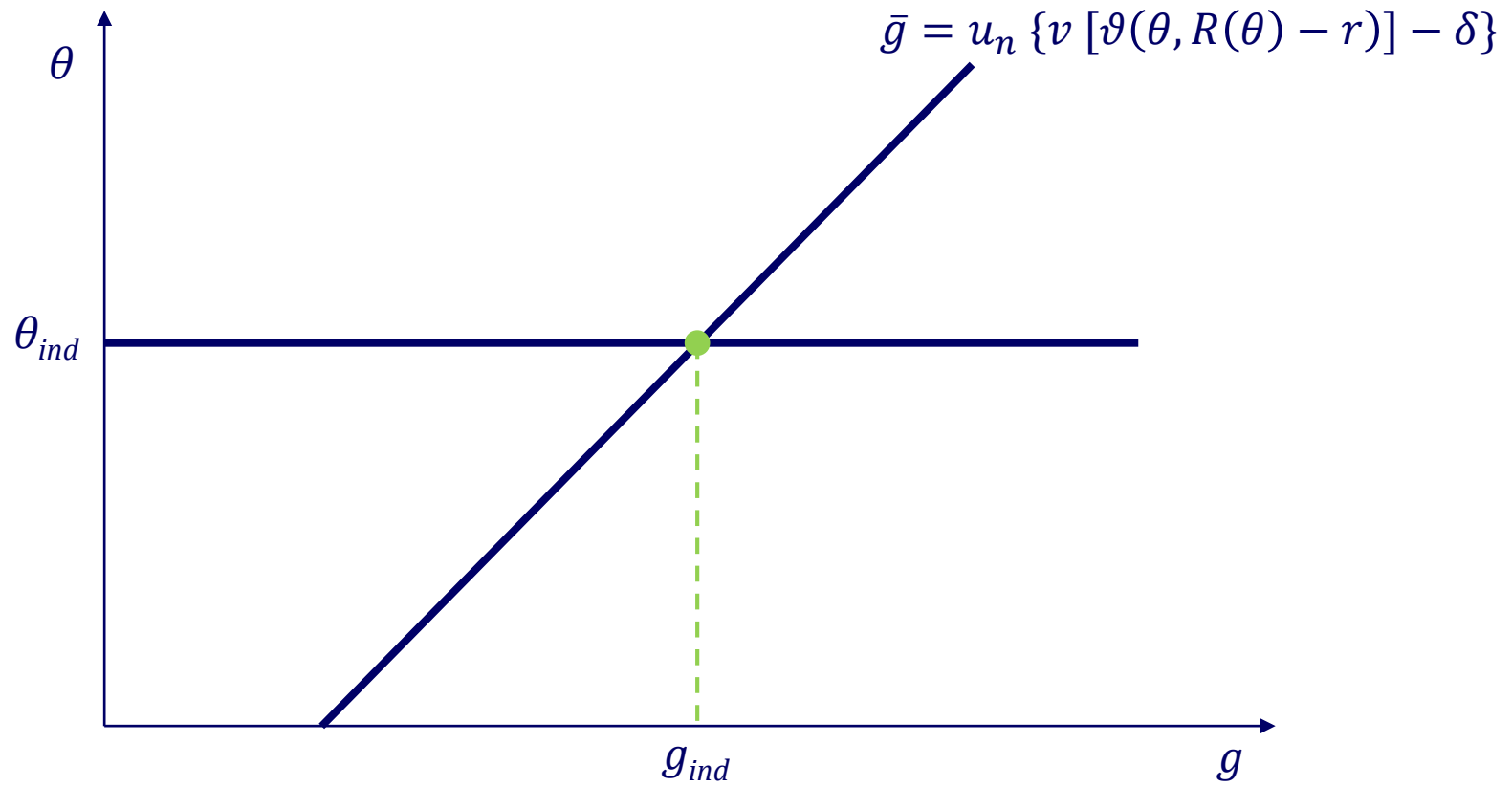
Long-Run Equilibrium with Dutch Disease

- **Constraints** on long-term **growth** usually derive from:
  - The **capacity** constraint (on the **supply** side)
  - The tendency of **wages** to grow below the **productivity** rate (on the **demand** side)
  - The tendency to the **overvaluation** of the currency (on the **access** to demand side)

- If the currency is **overvalued**,
  - A **primary-export** country will **not industrialized**
  - A **middle-income** country will **deindustrialize**

- If a primary-export country has **industrialized**, this is so because the **Dutch disease** was **neutralized**

Long-Run Equilibrium with Dutch Disease (cont'd)

- Consider a middle-income country that has **industrialized** but allows now the **exchange rate** to float freely

  - ➢ Suppose the country is able to keep a balance in the **current account** but $\boldsymbol{\theta_{cc} < \theta_{ind}}$

- Therefore, the country catches **Dutch disease** and the **currency** appreciates

  - ➢ **Profit margins** fall and **investment** decreases

  - ➢ **Production structure** shifts towards less value-added goods

  - ➢ Process of **deindustrialization** and **re-primarization** of exports

- The long-term **equilibrium** rate of growth falls: $\boldsymbol{g_{cc} < g_{ind}}$

Long-Run Equilibrium with Dutch Disease and Deindustrialization

$$\bar{g} = u_n \{ v [\vartheta(\theta, R(\theta) - r)] - \delta \}$$
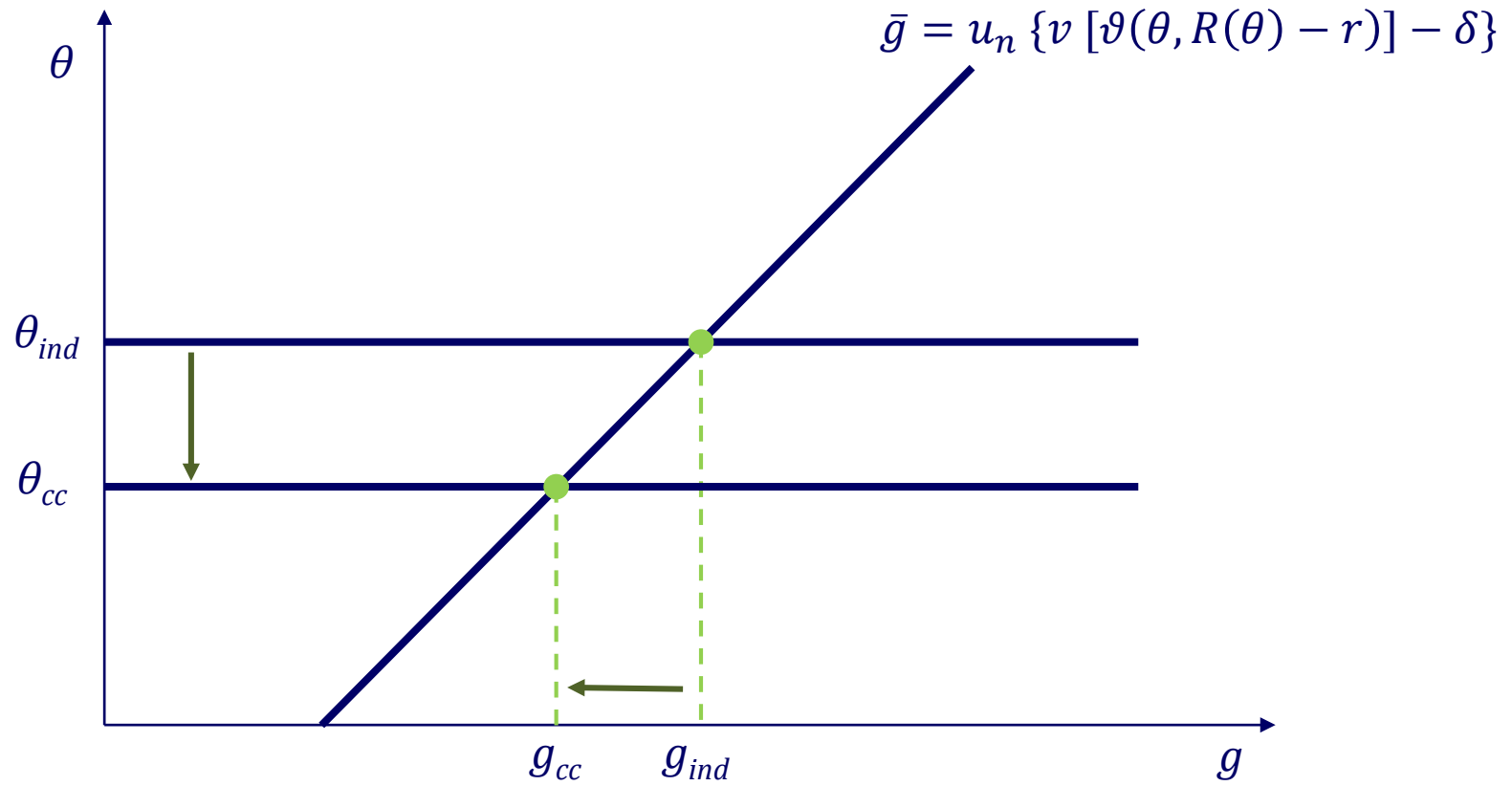
Long-Run Equilibrium with Dutch Disease and Excessive Capital Inflows

- **Excessive** and **unnecessary** capital inflows contributes to the further **appreciation** of the currency
  - ➢ **Excessive:** When they don't satisfy the economy's need for **stability** and **growth**
  - ➢ **Unnecessary:** If $\theta = \theta_{ind}$, then **current account** is in **surplus** and there is no need for capital inflows

- Capital **inflows** are the result of **interest rate** differential and the adoption of a **growth** cum **foreign saving** model

- Real **interest rates** are higher in developing countries due to:
  - ➢ Their capital **markets** are less developed
  - ➢ They tend to become **indebted** in foreign currency

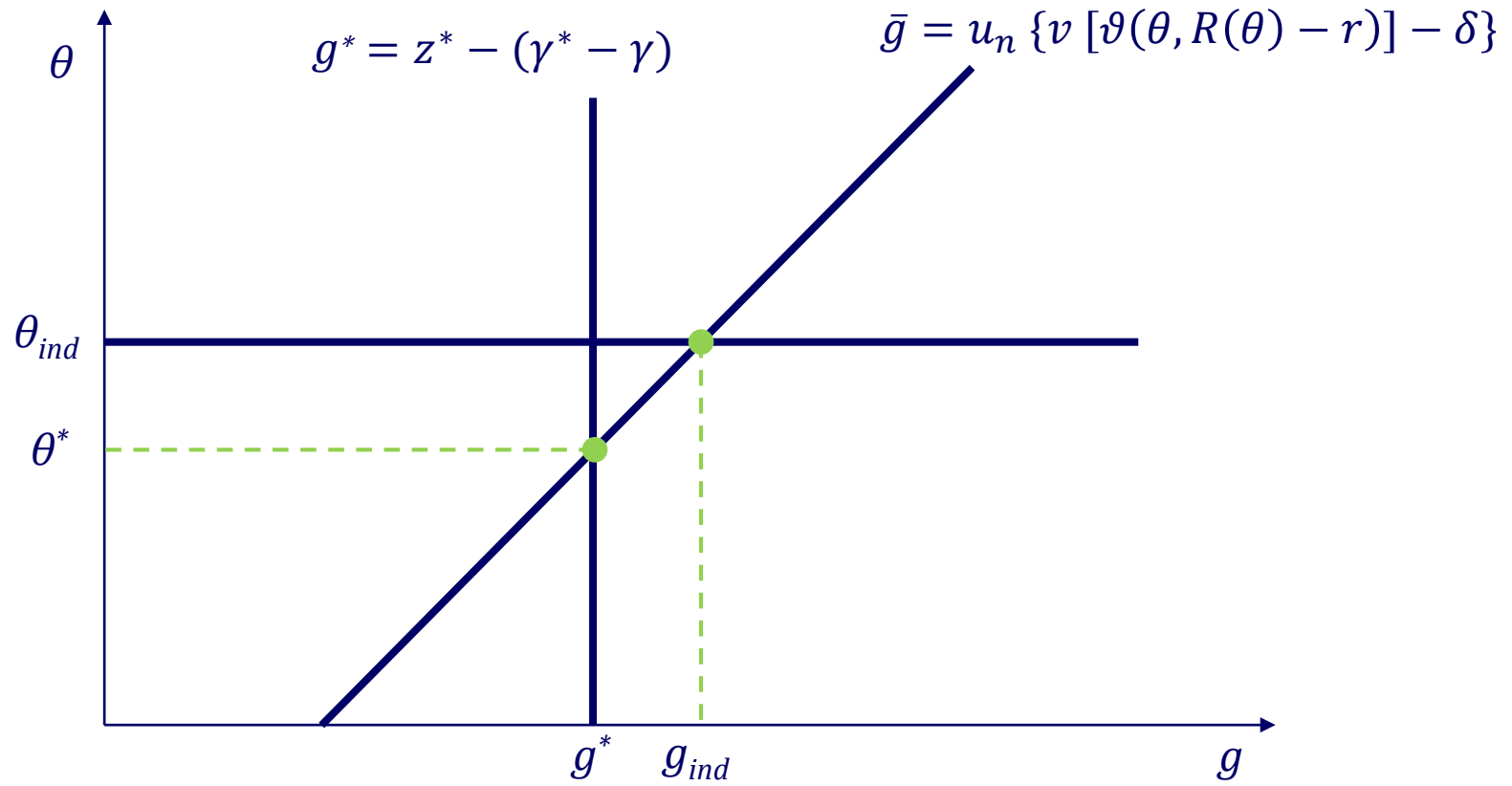# Long-Run Equilibrium with Dutch Disease and Excessive Capital Inflows
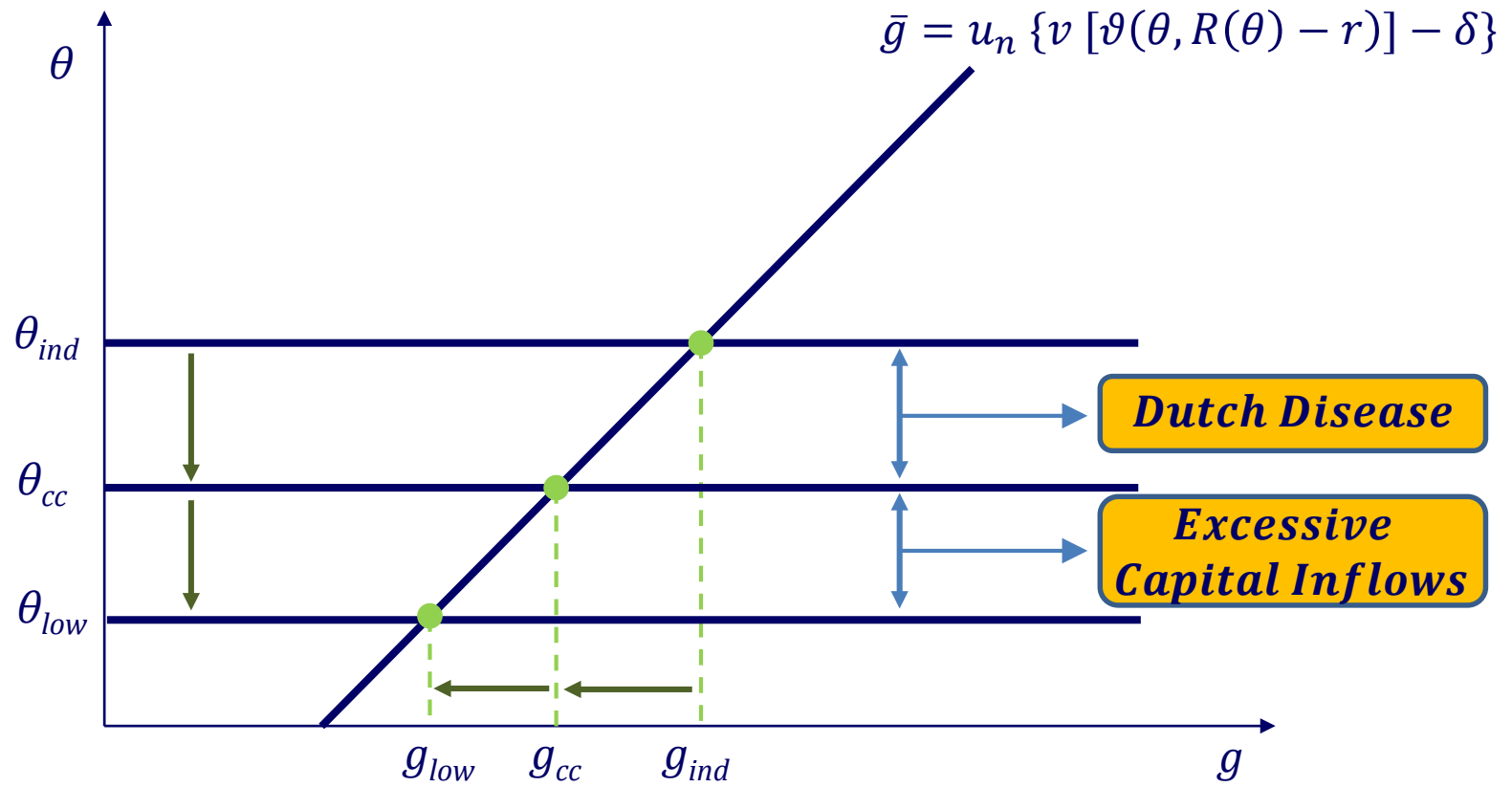
Long-Run Equilibrium and Catching-Up without Supply Constraint

- The combination of **Dutch disease** and excessive **capital inflows** make cause the economy to fall behind

- Suppose z^* is the developed countries' **income** *growth* rate and γ^* is their **population** growth rate
  - Therefore, $z^* - \gamma^*$ is their **per capita income** growth rate

- Suppose g is the middle-income country's **income** growth rate and γ is its **population** growth rate
  - Therefore, $g - \gamma$ is its **per capita income** growth rate

- Further, suppose that θ^* is the **real exchange rate** that ensures $g - \gamma = z^* - \gamma^*$ (let's call g^* this level of g)
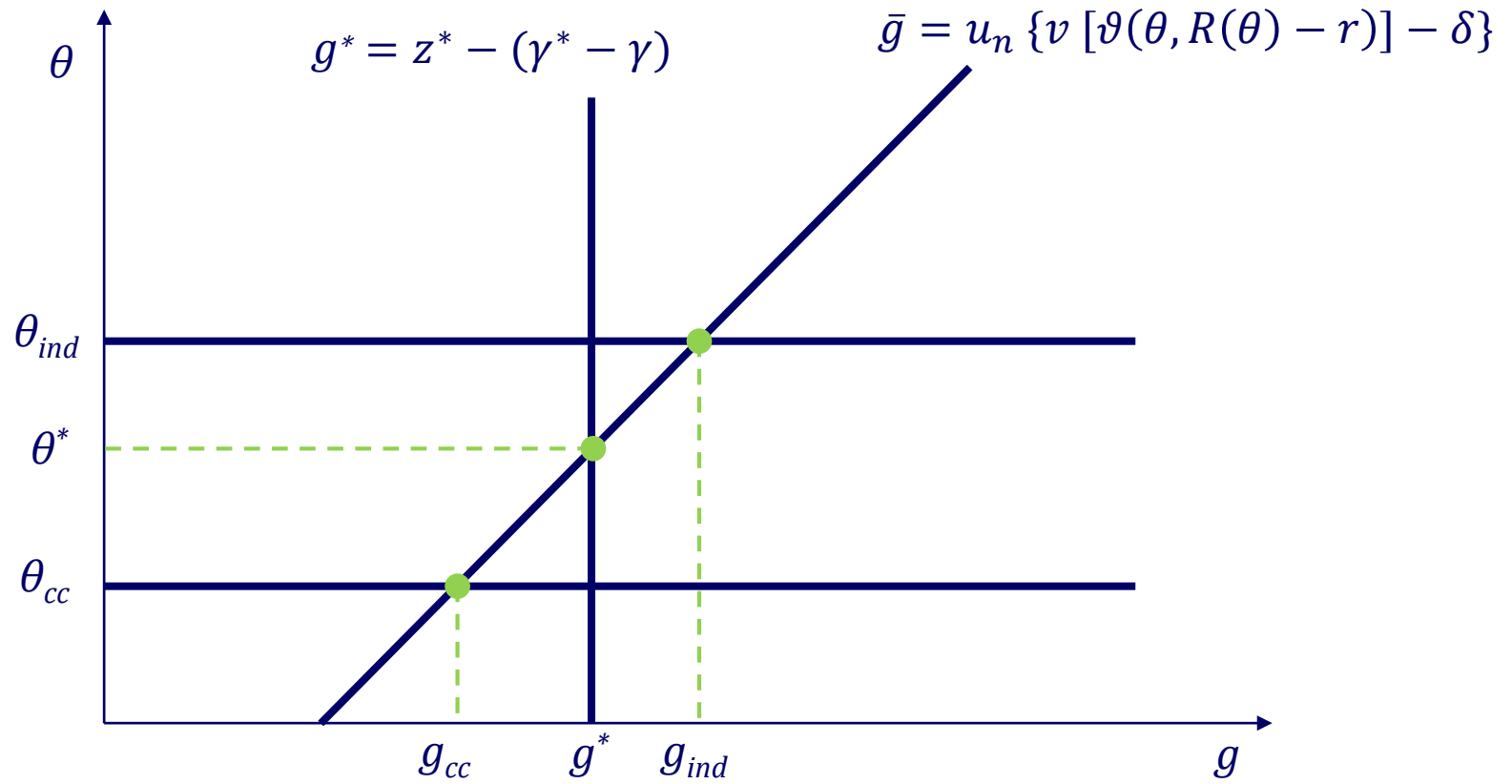 - Therefore, $g^* = z^* - (\gamma^* - \gamma)$ when $\theta = \theta^*$

Long-Run Equilibrium and Catching-Up without Supply Constraint (cont'd)

- If $\theta = \theta^*$, then $g^* = z^* - (\gamma^* - \gamma)$ and the middle-income country is neither **catching-up** with nor **falling behind** developed countries

- If $\theta > \theta^*$, then $g^* > z^* - (\gamma^* - \gamma)$ and the middle-income country is **catching-up** with developed countries

- If $\theta < \theta^*$, then $g^* < z^* - (\gamma^* - \gamma)$ and the middle-income country is **falling behind** relative to developed countries

- Therefore, if $\theta = \theta_{ind} > \theta^*$, then the middle-income country is **catching-up** with developed countries

- But, if due to the size of **Dutch disease**, $\theta = \theta_{cc} < \theta^*$, then the middle-income country is **falling behind**

Long-Run Equilibrium and Catching-Up without Dutch Disease ($\boldsymbol{\theta = \theta_{ind}}$)

$$g^* = z^* - (\gamma^* - \gamma)$$

$$\bar{g} = u_n \left\{ v \left[\vartheta(\theta, R(\theta) - r) \right] - \delta \right\}$$

Falling Behind Due to Dutch Disease ($\boldsymbol{\theta = \theta_{cc}}$)

$g^* = z^* - (\gamma^* - \gamma)$

$\bar{g} = u_n \{ v \left[\vartheta(\theta, R(\theta) - r) \right] - \delta \}$

θ

θ_{ind}

θ^*

θ_{cc}

g_{cc} g^* g_{ind}

g

Long-Run Equilibrium with Supply Constraint

- The process of economic development may also be constrained by the economy's **supply** conditions
  - ➢ This would happen if $\boldsymbol{\theta^*} > \boldsymbol{\theta_{ind}}$

- This situation may occur in a middle-income country where:
  - ➢ The normal degree of **productive capacity** $(\boldsymbol{u_n})$ utilization is relatively low
  - ➢ The **output-capital** ratio $(\boldsymbol{v})$ is relatively low

- Another possibility is that $\boldsymbol{\theta^*} > \boldsymbol{\theta_{ind}}$ to compensate for negative impact of high **interest rates** on **investment**

- But **exchange rate** policies do not aim to protect **inefficient** firms but to make **competitive** those that are **efficient**

Falling Behind Due to Supply Constraints ($\boldsymbol{\theta = \theta_{ind} < \theta^*}$)

$$g^* = z^* - (\gamma^* - \gamma)$$

$$\bar{g} = u_n \{v\left[\vartheta(\theta, R(\theta) - r)\right] - \delta\}$$
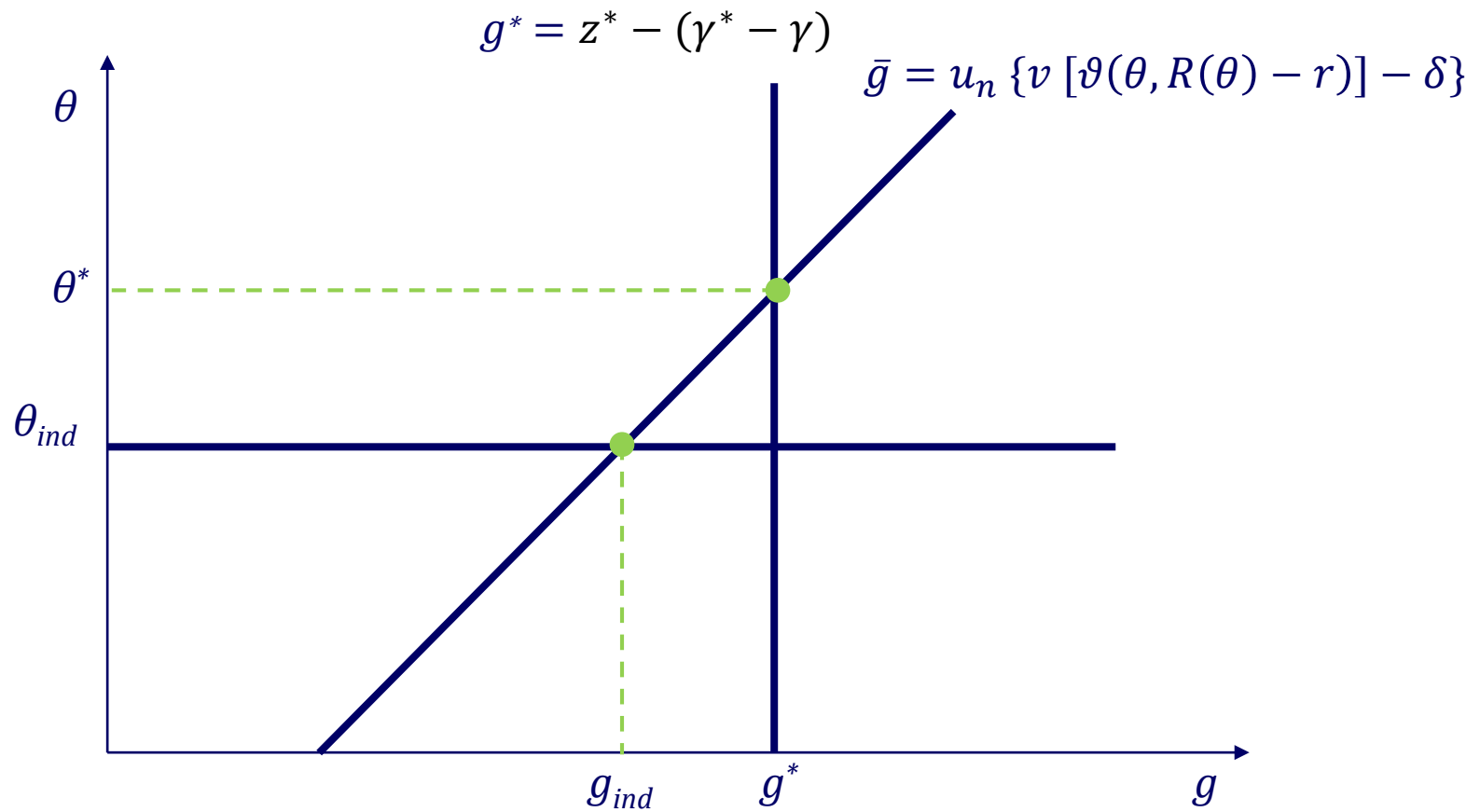
The Equilibrium Exchange Rate

- The **exchange rate** is the macroeconomic price that assures **access** to demand to **efficient** firms

- There is a tendency for the **cyclical** and **chronic** overvaluation of the currency

- The **current account** equilibrium exchange rate (e_{cc}) should be the equilibrium in the absence of **Dutch disease**

- If there is **Dutch disease**, the **industrial** equilibrium exchange rate (e_{ind}) should be the equilibrium

- When there are **capital inflows**, the **foreign debt** equilibrium exchange rate (e_{fd}) is the sustainable equilibrium
  - ➢ If $e < e_{fd}$, the country will face **financial instability** and eventually a **currency crisis**

The Cyclical and Chronic Tendency to Currency Overvaluation

e

e_{cc} – Current Account Equilibrium Exchange Rate

e_{ind} – Industrial Equilibrium Exchange Rate

e_{fd} – Foreign Debt Equilibrium Exchange Rate

e_{ind}

e_{cc}

e_{fd}

Current Account Deficit

Currency Crisis

Currency Crisis

Time