

CHAPTER 6**ECONOMIC GROWTH****1. (C) endogenous growth model.****Explanation**

The endogenous growth model hypothesizes that expenditures on R&D and knowledge capital generate benefits to the economy as a whole, beyond the private benefit to the investing company. Under the endogenous growth model, the resulting increase in growth is likely to be enduring.

(Module 6.3, LOS 6.k)

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2. (B) Limited ownership of natural resources.**Explanation**

A lack of access to natural resources could well restrain growth. Currency appreciation will lead to high export prices and uncompetitive domestic industries in the global market. A lack of ownership of natural resources need not hinder growth as long as the economy has access via trade.

(Module 6.2, LOS 6.f)

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3. (B) higher current savings.**Explanation**

Positive growth in potential GDP leads to an expectation of rising incomes leading to higher current consumption, not higher savings. To encourage savings, investments must offer higher real asset returns and higher real interest rates.

(Module 6.1, LOS 6.c)

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4. (B) **improvement in technology.**

Explanation

Labor productivity can be enhanced by capital deepening and/or improvement in technology. Increase in labor force participation and average hours worked will increase the size of labor force but not labor productivity.

(Module 6.2, LOS 6.g)

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5. (C) **can be lower in the short-term but is equal in the long run.**

Explanation

In the short-term, appreciation in the aggregate stock market can be lower (or higher) than the growth rate in potential GDP. However, in the long-run, aggregate stock market appreciation should be equal to growth rate in potential GDP.

(Module 6.1, LOS 6.b)

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6. (C) **only channeling investment to projects with the highest risk-adjusted returns.**

Explanation

Well-developed financial markets encourage investment and hence growth by channeling investments to those projects with the highest risk-adjusted return. An increase in leverage resulting from the development of capital markets may lead to higher risk but not growth.

(Module 6.1, LOS 6.a)

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7. (A) **enjoy the technological progress of a country with a vigorous manufacturing sector.**

Explanation

Countries with poor endowments of natural resources may enjoy relatively high levels of GDP growth rate as long as they have access to natural resources. Dutch disease refers to situation where a country with large endowments of natural resources finds its currency appreciating driven by foreign demand for those resources. This increase in currency value may render other domestic industries uncompetitive globally, and the country may not participate in the TFP progress seen in countries with strong manufacturing sectors. Countries with abundant natural resources may devote disproportionate amount of its economic energy in pursuing those resource industries at the expense of other industries.

(Module 6.2, LOS 6.f)

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8. (C) 4%

Explanation

Using the growth accounting equation:

$$\begin{aligned}\text{growth rate in potential GDP} &= \text{long-term growth rate of labor force} + \text{long-term} \\ &\quad \text{growth rate in labor productivity} \\ &= 2\% + 2\% \\ &= 4\%.\end{aligned}$$

(Module 6.2, LOS 6.e)

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9. (C) The neoclassical theory contends that countries will eventually have the same growth rates and per capita income

Explanation

The neoclassical model assumes that all countries have access to the same technology and contends that growth rates but not per capita income will converge.

(Module 6.3, LOS 6.j)

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10. (C) Statement 2 only

Explanation

Investment in human capital improves knowledge and skills, increasing productivity not hours worked. Public infrastructure projects (e.g. construction of transport networks) will increase the effectiveness of private investment (e.g. distribution centers).

(Module 6.2, LOS 6.h)

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11. (C) Social returns benefit society as a whole and encourage private firms to invest more aggressively in R&D which in turn fuels growth

Explanation

Private firms often fail to consider external social benefits and hence will not invest in the optimal level of R&D for the economy as a whole.

(Module 6.3, LOS 6.k)

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12. (C) **The creation of knowledge capital and real interest rates.**

Explanation

The endogenous growth theory holds that productivity growth is a function of society's ability to discover new products and methods (i.e., the creation of knowledge capital), and real interest rates.

(Module 6.3, LOS 6.i)

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13. (B) **technological progress.**

Explanation

Improvement in potential GDP growth in developed countries is largely driven by technological progress. Developing countries have the potential to grow through both capital deepening and technological progress.

(Module 6.2, LOS 6.h)

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14. (B) **In steady state, the rental price of capital is equal to additional output resulting from use of an additional unit of capital.**

Explanation

Neoclassical theory contends diminishing marginal productivity of capital but constant marginal product of capital. In steady state, marginal product of capital (MPK) is equal to the rental price of capital. MPK is the additional output resulting from an additional unit of capital.

(Module 6.3, LOS 6.i)

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15. (B) **5.15%.**

Explanation

Using the growth accounting equation: growth rate in potential GDP = long-term growth rate of technology + α (long-term growth rate of capital) + (1 - α)(long-term growth rate of labor)

$$= 2.5\% + (0.65)(3\%) + (0.35)(2\%) = 5.15\%$$

(Module 6.2, LOS 6.e)

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16. (A) Low rates of savings.

Explanation

Conditional convergence means that convergence is conditional on the countries having the same saving rate, population growth rate, and production function. Low rates of savings is one factor that can cause a developing country to fail to converge.

(Module 6.3, LOS 6.j)

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Wisterbon, Pratia and Surico are neighboring nations. The three countries share borders and frequently trade with each other.

Pratia

- A developing nation with an abundant oil reserves
- Primary economic activity is oil industry

Wisterbon

- A developing nation focusing on labor intensive industries because it lacks many natural resources

Surico

- A developed nation
- Largest trading partner for both the other two countries

The following economic and demographic statistics are available for the three countries.

	Wisterbon	Pratia	Surico
GDP (in \$ billions) 10 years ago	\$ 100.0	\$100.00	\$3,000.00
GDP (in \$ billions) Current	\$156.0	\$164.00	\$4,209.00
Long-term growth rate in technology (est.)	1.5%	1.2%	2.1%
Long-term growth rate of capital	4.9%	4.40%	3.4%
Sovereign credit rating	A	A+	AAA
Savings rate (average is 10.0%)	12.5%	10.0%	5.0%
Population (in millions)	10.2	10.0	50.4
Labor Growth Rate	2.8%	2.5%	0.6%
Cost of capital relative to total factor cost	30.0%	35.0%	27.5%
Capital Growth Rate	4.9%	4.4%	3.4%
TFP Growth Rate	1.5%	1.2%	2.1%

The three countries have sent their top finance ministers and economists to the annual Trade and Economic Growth Forum (TEGF) to discuss potential trade and growth opportunities. Comments pertaining to concerns regarding future growth potential included:

Economist #1:	We are concerned about the GDP per capital and population growth. The current GDP per capital appears to be beyond the subsistence level.
Economist #2:	We are concerned that the output per capital ratio has been constant. It is likely that the equilibrium growth rate has been reached and the economy cannot growth any faster.
Economist #3:	We are concerned that we are not investing enough in infrastructure and education to the growth rate.

Some common initiatives for economic growth were listed from the TEGF:

1. Fund a technology research center'
2. Lower trade barriers
3. Provide financial incentives for innovation
4. Coordinate energy policies
5. Invest in education

Each country decided to adopt four of the five initiatives. Pratia did not like lowering trade barriers. Surico did not like coordinating energy policies. Wisterbon did not like providing financial incentives for innovation.

17. (A) Surico.

Explanation

Surico is a developed country and has the lowest share of output allocated to capital of 27.5%. Surico will gain less from capital deepening. The growth rate in potential GDP for Surico is $2.1\% + (0.275) \times (3.4\%) + (0.725) \times (0.6\%) = 3.4\%$. About 61% of potential GDP growth is based on the total factor of production (TFP), the highest of the three.

(Module 6.1, LOS 6.d)

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18. (B) Economist #2.

Explanation

The neoclassical growth theory is based on when the output to capital ratio is constant, both the labor to capital ratio and output per capita grow at the same equilibrium rate. Economist #1's concern is supported by the classical growth theory and Economist #3's concern is supported by the endogenous growth theory.

(Module 6.1, LOS 6.d)

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19. (A) **consideration of private benefits alone would lead to suboptimal investment in R&D.**

Explanation

When private investments in R&D are sub-optimal, financial incentives may restore the level of investment to optimal levels. Under the endogenous growth theory, the growth rate in standard of living can be achieved via technological growth as well as capital deepening. Convergence of standard of living would only be an incentive for developing countries.

(Module 6.1, LOS 6.d)

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20. (C) **research and development to increase TFP.**

Explanation

Surico is a developed country. It is not likely to benefit much from capital deepening and application of technology. Innovations and research and development can increase the total factor productivity which is more likely to increase the impact of growth in potential GDP.

(Module 6.1, LOS 6.d)

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21. (B) **Reinvestment of dividends.**

Explanation

The appreciation of aggregate stock market depends on GDP growth rate, growth of share of capital in GDP and growth in P/E multiples. In the long run, stock market appreciation depends only on GDP growth rate as the other two factors cannot increase (or decrease) in perpetuity.

(Module 6.1, LOS 6.b)

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22. (B) **Subsistence real wage.**

Explanation

Classical growth theory contends that there is a subsistence real wage, defined as the minimum real wage necessary to support life. Whenever real wages are greater than the subsistence real wage, the population will increase, leading to diminishing returns to labor, and eventually, decreased labor productivity. The key to classical growth theory is the population explosion that occurs whenever real GDP per labor hour increases above the subsistence level, which will eventually eliminate any gains from increased labor productivity.

(Module 6.3, LOS 6.i)

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West Lundia and Cragistan are neighboring emerging market nations. These two countries share a border and frequently trade with each other. Cragistan has abundant oil reserves and precious metals, both of which West Lundia lacks. Kurtenstein is a developed market nation that borders both West Lundia and Cragistan and is the largest trading partner for both the other two countries. Kurtenstein is a major buyer of Cragistan's unrefined petroleum and West Lundia's cheaper labor. All three countries are politically stable and have formed a regional monetary union, known as WICKA (West Lundia, Cragistan, Kurtenstein Alliance — pronounced 'wicka'). Their currency, the WickA Rand or WCK, is a free floating currency.

Exhibit 1 shows selected economic and demographic statistics are for the three countries and for the year 20X1.

Exhibit 1: Selected economic and demographic statistic for 20X1

	West Lundia	Cragistan	Kurtenstein
Population (in millions)	5.63	5.52	25.18
Labor force participation (in %)	64.50%	64.50%	71.20%
GDP (in \$ billions)	\$50.0	\$50.0	\$1,500.0
Share of capital in total GDP	40.00%	35.00%	20.00%
Average Hrs. per worker in labor force per yr.	1690.0	1690.0	1898.0
Sovereign credit rating	A	A+	AAA
Savings rate (average is 10.0%)	12.5%	10.0%	5.0%
Imports (in \$ billions)	\$7.50	\$15.00	\$250.00
Exports (in \$ billions)	\$8.00	\$20.00	\$200.00

Analysts' projected 10 year estimates are provided in Exhibit 2. Cragistan's projected population growth is based on a slightly higher fertility rate but also a less restrictive immigration policy.

10 Year estimates	West Lundia	Cragistan	Kurtenstein
Population (in millions)	6.44	6.51	25.94
Labor force participation (in %)	68.50%	65.50%	72.20%
Average Hrs. per worker in labor force per yr.	1794.0	1742.0	1908.4
GDP (in \$ billions)	\$78.0	\$82.0	\$2,014.0
Long-term growth rate in technology	1.20%	1.40%	2.00%
Long-term growth rate of capital	4.80%	4.50%	3.00%

The forecasted growth rate in potential GDP for Cragistan and Kurtenstein are 4.4% and 3.0% respectively. The estimated long-term actual GDP growth rate for West Lundia is lower than its estimated potential GDP growth rate.

Monetary Policy:

- All three countries have relatively independent central banks.
- All three target inflation as a primary goal.

Fiscal Policy:

- West Lundia has a slight surplus and actively seeks to affect aggregate demand.
- Cragistan has a moderate surplus and may seek to affect aggregate demand.
- Kurtenstein has a slight deficit and does not actively affect aggregate demand.

International Trade:

- West Lundia is a net exporter.
- Cragistan is a net exporter.
- Kurtenstein is a net importer.

Financial Markets:

- Kurtenstein has well established high volume liquid equity and fixed income markets.
- Cragistan and West Lundia both have moderately liquid equity markets.
- Cragistan has a credit market with more volume and smaller credit spreads than West Lundia.

23. (B) labor force participation rates.**Explanation**

West Lundia has a slightly lower fertility rate and a less friendly immigration policy both leading to, ds, a lower expected population growth rate of 1.4% while Cragistan's population is expected to grow at 1.7%. West Lundia's growth rate of labor is caused by a higher labor force participation rate and an increase in the number of hours per worker.

(Module 6.1, LOS 6.a)

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24. (A) The savings rate between the two countries.

Explanation

One precondition for growth is adequate savings and investment. A country with a higher savings rate is likely to have a higher potential growth since a country with a higher savings rate is less likely to need foreign investments for growth. Because both Cragistan and Kurtenstein are both part of the monetary union with a floating currency, there is no difference in free trade and restrictions on capital flows. Cragistan has a less established financial sector, but the difference in itself may not be a potential benefit or a potential issue.

(Module 6.1, LOS 6.a)

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25. (B) institutions are becoming standardized according to regional monetary union guidelines.

Explanation

Under club convergence, countries can 'join' the club by making appropriate institutional changes. Both West Lundia's and Cragistan's adherence to regional monetary union standards show their willingness to join the developed nations' club. Emerging nations' long-term growth converging toward a developed country's long-term growth rates is part of the absolute convergence hypothesis. The conditional convergence hypothesis states that convergence in living standards will only occur for countries with the same savings rates, population growth rates, and production functions.

(Module 6.1, LOS 6.a)

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26. (B) 3.0%.

Explanation

Over the long-term, the growth in earnings relative to GDP is zero; labor will be unwilling to accept an ever decreasing share of GDP and the growth in P/E ratio will also be zero over the long term as the P/E ratio cannot grow indefinitely. Over the long run, the growth in aggregate stock market value should equal the growth in GDP.

(Module 6.1, LOS 6.a)

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27. (A) Alpha (α) represents the share of output allocated to capital and a smaller α indicates a lower benefit of capital deepening.

Explanation

Alpha (α) represents the share of output allocated to capital and tends to be higher in developing economies. A lower α implies lower benefits of increasing capital per worker (capital deepening).

The model overall displays constant returns to scale.

(Module 6.1, LOS 6.d)

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28. (C) Immigration.

Explanation

A slowdown in population growth is likely to constrain growth. The wealth effect reduces total hours worked as individuals opt to take more leisure time. Immigration may offset the slowdown in population growth.

The model overall displays constant returns to scale.

(Module 6.2, LOS 6.g)

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29. (A) Long-term growth in the aggregate stock market valuation is most closely correlated to long term growth in GDP.

Explanation

In the long run both the E/GDP and P/E ratios will have zero growth. Stock market appreciation is therefore most closely related to growth in GDP.

(Module 6.1, LOS 6.b)

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30. (C) Credit spreads on fixed income investments widen.

Explanation

An increase in growth rate of potential GDP (keeping actual growth rate unchanged) would most likely allow the government to pursue expansionary monetary/fiscal policies. An increase in growth rate of potential GDP reduces expected credit risk for all fixed income securities and hence narrows the credit spreads.

Note: The question does not provide any information about actual growth rate, hence we have to assume it to be constant for a least likely type question.

(Module 6.1, LOS 6.c)

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31. (A) Gordon has assumed that the elasticity of output with respect to labor is lower in Utopia than Ruritania.

Explanation

Using the Cobb-Douglas production function, the growth rate in potential GDP can be calculated as:

$$\text{Growth rate in Potential GDP} = \text{growth rate in TFP} + \alpha(\text{growth rate capital}) + (1 - \alpha)(\text{growth rate labor})$$

Where α = elasticity of output with respect to capital

And $(1 - \alpha)$ = elasticity of output with respect to labor

The only data given that is different for the two countries is the assumed labor growth rate. In order to calculate the same GDP growth rate, Gordon must assume a higher α and hence a lower $(1 - \alpha)$.

$$\text{For Ruritania: } 4.3\% = 1.8\% + 3.1\%(\alpha) + 2.2\%(1 - \alpha)$$

$$\text{Solving algebraically for } \alpha \text{ for Ruritania: } \alpha = 0.33 \text{ and } (1 - \alpha) = 0.67$$

$$\text{For Utopia: } 4.3\% = 1.8\% + 3.1\%(\alpha) + 1.7\%(1 - \alpha)$$

$$\text{Solving algebraically for } \alpha \text{ for Utopia: } \alpha = 0.57 \text{ and } (1 - \alpha) = 0.43$$

Thus Gordon has assumed that the elasticity of output with respect to labor $(1 - \alpha)$ is lower in : Utopia (0.43) than Ruritania (0.67)

(Module 6.2, LOS 6.e)

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32. (C) Both statements are correct.

Explanation

Both statements are correct. Countries are able to focus on comparative advantage when free trade is allowed. Developing economies will see a slowing of growth, and increased investment leads to a convergence to the steady state growth rate of developed economies.

(Module 6.3, LOS 6.I)

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33. (A) endogenous growth theory.

Explanation

Lenser's statement is a decent layman's description of the endogenous growth theory. This theory argues that economic growth can continue indefinitely as long as technological advances are made.

(Module 6.3, LOS 6.i)

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34. (A) Gurtania has a sustainable growth rate of over 4% according to neoclassical growth theory.

Explanation

Classical growth theory contends that growth is not sustainable, hence both economies should have a sustainable growth rate of zero.

Neoclassical growth theory calculates the sustainable growth rate as $[\theta/(1 - \alpha)] + \text{Growth Labor}$

$$\text{Sangarnio: } 1.8/0.55 + 1.1 = 4.38\%$$

$$\text{Gurtania: } 1.9/0.60 + 1.0 = 4.17\%$$

Sangarnio has a higher sustainable growth rate than Gurtania, but Gurtania does have a growth rate over 4%.

(Module 6.3, LOS 6.i)

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35. (A) No diminishing returns to knowledge capital.

Explanation

Knowledge capital is a special type of public good because it is not subject to the law of diminishing returns. This is a key element of endogenous growth theory. The implication is that, unlike the classical or neoclassical growth theories, economic growth is not limited.

(Module 6.3, LOS 6.i)

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36. (B) purchasing equity securities.

Explanation

Foreign direct investing refers to a foreign company investing directly in a domestic economy by building or buying property, plant, and equipment. A foreign company purchasing equity or fixed income securities issued by a domestic company is best described as indirect investing.

(Module 6.3, LOS 6.i)

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