

DISCUSSION QUESTION

Name:

Instructor:

Course:

From 1995 - 2014, China's GDP per capita grew, on average, by approximately 9% per year. This stands in contrast to growth of less than 2% per year, on average, during the same time period in the U.S. In constant, 2013 dollars, China's GDP per capita income increased from \$530 in 1995 to more than \$6,800 in 2014. Source: <http://data.worldbank.org/country/china>

- a) What factors have contributed to China's rapid rate of growth?

- b) Do you think it is reasonable to say that China's economy is currently stronger than the U.S. economy?

- c) Is it likely that China will sustain this high growth rate for another 20 years? Explain.

PEER GROUP PROBLEM SOLVING

Name:

Instructor:

Course:

In 1870, U.S. real GDP per capita was equal to approximately \$3,040 (in 2005 dollars). Since 1870, the U.S. has experienced average growth rates equal to 2%. Use the rule of 70 to answer the following questions.

- a) What was the approximate real GDP per capita in 1940 and in 2010?

- b) Suppose the average rate of growth was only 1% instead of 2%. What would the approximate U.S. real GDP per capita equal in 2010?

- c) Suppose the average rate of growth was 3% instead of 2%. What would the approximate U.S. real GDP per capita equal in 2010?

- d) Suppose the U.S. will continue to average a growth rate equal to 2% into the distant future. What will U.S. real GDP per capita equal in 2080 and 2150?

IN-CLASS EXPERIMENT / ACTIVE EXERCISE

Have students form groups of 4 or 5 and consider the following scenario:

In 2012, Ghana had a per capita income equal to \$4,000, Costa Rica had a per capita income equal to approximately \$12,000 and the U.S. had a per capita income equal to approximately \$48,000.

Suppose Ghana grows at a rate of 5% per year, Costa Rica grows at a rate of 4% per year and the U.S. grows at a rate of 2% per year.

- a) Approximately how long will it take for Ghana's per capita income to equal the U.S.'s per capita income?
- b) Approximately how long will it take for Costa Rica's per capita income to equal the U.S.'s per capita income?

SOLUTIONS AND INSTRUCTOR NOTES

Discussion Question

From 1995 - 2014, China's GDP per capita grew by approximately 9% per year, on average. This is in contrast to growth of less than 2% per year, on average, during the same time period in the U.S. In constant, 2013 dollars, China's GDP per capita income increased from \$530 in 1995 to more than \$6,800 in 2014. Source: <http://data.worldbank.org/country/china>

- a) What factors have contributed to China's rapid rate of growth?

Since 1980, China has liberalized their economy and embraced open market reforms. This has spurred entrepreneurship, advancements in technology, and resulted in a more efficient allocation of resources. In addition, since China started at a low level of per capita income, relatively small investments in capital have a larger impact on economic growth.

- b) Do you think it is reasonable to say that China's economy is currently stronger than the U.S. economy?

Although China has had a higher growth rate, their per capita income is still not close to U.S. per capita income. In 2014, U.S. per capita income was \$55,000, more than 8 times the per capita income in China.

- c) Is it likely that China will sustain this high growth rate for another 20 years? Explain.

In the long run, it is unlikely that China's high growth rates will be sustained. As China's economy continues to grow, capital begins to exhibit diminishing marginal returns. Economic growth in China is likely to continue, however it will most likely increase at a slower pace.

Peer Group Problem Solving

In 1870, U.S. real GDP per capita was equal to approximately \$3,040 (in 2005 dollars). Since 1870, the U.S. has experienced average growth rates equal to 2%. Use the rule of 70 to answer the following questions.

- a) What was the approximate real GDP per capita in 1940 and in 2010?

With an average growth rate of 2%, GDP per capita will double every 35 years. In 1940 it will equal: $\$3,040 \times 2 = \$6,080$ and $\$6,080 \times 2 = \$12,160$. In 2010 it will equal: $\$12,160 \times 2 = \$24,320$ and $\$24,320 \times 2 = \$48,640$.

- b) Suppose the average rate of growth was only 1% instead of 2%. What would the approximate U.S. real GDP per capita equal in 2010?

With an average growth rate of 1%, GDP per capita will double every 70 years. In 1940 it will equal: $\$3,040 \times 2 = \$6,080$. In 2010 it will equal: $\$6,080 \times 2 = \$12,160$.

- c) Suppose the average rate of growth was 3% instead of 2%. What would the approximate U.S. real GDP per capita equal in 2010?

With an average growth rate of 3%, GDP per capita will double every 23.33 years, so it would have doubled six times since 1870. In 2010 it would equal:

$$\$3,040 \times 2 = \$6,080$$

$$\$6,080 \times 2 = \$12,160$$

$$\$12,160 \times 2 = \$24,320$$

$$\$24,320 \times 2 = \$48,640$$

$$\$48,640 \times 2 = \$97,280$$

$$\$97,280 \times 2 = \$194,560$$

- d) Suppose the U.S. will continue to average a growth rate equal to 2% into the distant future. What will U.S. real GDP per capita equal in 2080 and 2150?

In 2080 it will equal $\$48,640 \times 2 = \$97,280$ and $\$97,280 \times 2 = \$194,560$. In 2150 it will equal $\$194,560 \times 2 = \$389,120$ and $\$389,120 \times 2 = \$778,240$.

In-Class Experiment / Active Exercise

Have students form groups of 4 or 5 and consider the following scenario:

In 2012, Ghana had a per capita income equal to \$4,000, Costa Rica had a per capita income equal to approximately \$12,000 and the U.S. had a per capita income equal to approximately \$48,000.

Suppose Ghana grows at a rate of 5% per year, Costa Rica grows at a rate of 4% per year and the U.S. grows at a rate of 2% per year.

The purpose of this exercise is to get students to consider how small differences in growth rates make large differences in income levels over time. After students have had approximately five minutes to consider the questions ask for volunteers to discuss their answers in front of the class.

It may be worth advising students to use a table to answer these questions.

- a) Approximately how long will it take for Ghana's per capita income to equal the U.S.'s per capita income?

Years	Ghana	U.S.
0	\$4,000	\$48,000
14	\$8,000	
28	\$16,000	
35		\$96,000
42	\$32,000	
56	\$64,000	

70	\$128,000	\$192,000
84	\$256,000	

It will take slightly less than 80 years for Ghana's GDP per capita to equal the U.S.'s GDP per capita.

- b) Approximately how long will it take for Costa Rica's per capita income to equal the U.S.'s per capita income?

Years	Costa Rica	U.S.
0	\$12,000	\$48,000
17.5	\$24,000	
35	\$48,000	\$96,000
52.5	\$96,000	
70	\$192,000	\$192,000

It will take approximately 70 years for Costa Rica's GDP per capita to equal the U.S.'s GDP per capita.

For more in-class experiment and active learning ideas, visit www.econedactive.com.