



Choice:

ECONOMICS MATERIALS FOR
SUCCESS

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Productivity – Productivity in the U.S. in the age of AI.

Related news article: [The American worker is becoming more productive](#) (WSJ, January 2, 2025)

Summary: This worksheet could be used for in-class or homework practice. Students will be asked to read the *excerpts* from a short article about the increase in productivity in the U.S. Specifically, productivity, as measured by the output divided by the hours worked, increased by 2% in the third quarter of 2024 compared with a year earlier. Unlike the 1990s when personal computers and the Internet reshaped the economy, the reasons for the current, smaller productivity growth include the adoption of technologies such as artificial intelligence (AI) that improve efficiency, and new ways of completing tasks that companies have learned (e.g., automating processes, videoconferencing, using QR codes, etc.). Greater productivity fosters economic growth. However, there are both winners and losers because AI could make workers more efficient and create new occupations, but other workers whose work gets automated could lose their jobs.

Then, students will discuss the reasons for the productivity growth in the U.S. and its effect on the economy. They will also express their opinion regarding whether this growth in productivity is likely to last. The set of questions will help students practice main ideas related to production, the production function, the production possibilities frontier (PPF) and the labor market. **Answers are provided at the end of this document.**

Learning objectives: At the end of this worksheet, students will be able to:

- o Understand how productivity is measured;
- o Analyze factors that foster an increase in productivity;
- o Graph a production function;
- o Analyze the effect of the adoption of AI on the production possibilities frontier (PPF) of a gym that utilizes AI;
- o Understand that there are both winners and losers from the adoption of AI;
- o Explain why some workers could benefit from new technologies such as AI while others could be hurt;
- o Understand the connection between wages, output and productivity;
- o Evaluate the effect of an increase in productivity on wages.

Economics concepts: Productivity, Marginal product of labor, Economic growth, Revenue, Profit, Wage, Technological advancement, Production possibilities frontier (PPF), Production function, Diminishing marginal product

Suggested excerpts:



“U.S. workers are getting more done. That’s great for the economy—though not always great for workers.”

“Take Vic Viktorov, a gym owner who increased revenue at his Boston business in 2024 by 30% without adding a single salesperson to the two already on staff. Instead, he has been using an artificial-intelligence model loaded with company documents, sales materials and other information. Now, he can complete in just minutes work that used to take hours, such as writing marketing plans, email drafts and social-media posts.”

“Productivity in the U.S., as measured by how much the average worker gets done in an hour, has been on the rise. That matters because the faster that productivity grows, the faster the economy can grow as well.”

“Productivity—the total output of the economy divided by hours worked—rose 2% in the third quarter [of 2024] compared with a year earlier, according to the Labor Department.”

“The gains in part reflect massive changes in the U.S. economy since the onset of Covid-19. Companies learned new ways of doing things and adopted new technologies, while an upheaval in the labor market moved workers into more productive jobs.”

“Businesses learned new ways to operate: QR codes instead of paper menus at restaurants, for example, or a videoconference instead of a time-consuming trip out of town. There has also been a big and continuing jump in the number of new businesses getting started.”

“... increased productivity isn’t always good news for workers: One way that companies get more productive is by laying off employees. New technologies such as AI can create new jobs and make workers more efficient—or take their jobs.”

“... it isn’t clear that the move up in productivity growth will last. The figures are both volatile and subject to revision. [...] And so far, productivity isn’t experiencing anything like the boom in the 1990s, when the wide-scale adoption of the personal computer and the advent of the internet reshaped the economy.”

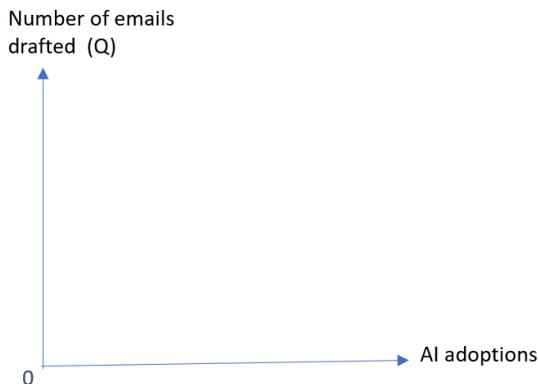
“Economic growth fundamentally relies on how many people are working and how much they can produce while they are on the clock.”

“Productivity also helps keep inflation in check: A more efficient business can be more profitable and pay its workers more without raising prices.”

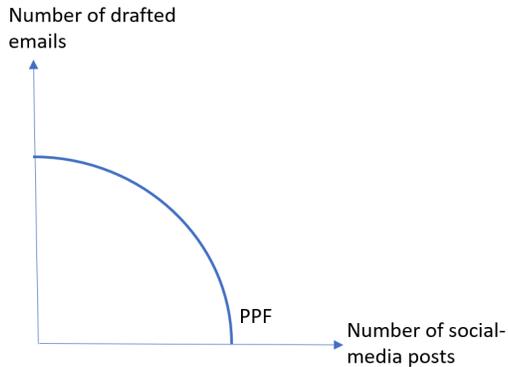


Student Questions

1. True or false? According to the article, productivity in the U.S., as measured by the output the average worker produces in an hour, increased by 2% in the third quarter of 2024 compared with a year earlier.
2. Which of the following statements about productivity is correct? Select *all* that apply.
 - An improvement in productivity fosters economic growth.
 - Greater productivity always leads all companies to laying off workers.
 - Workers' productivity improves when they use physical capital such as computers and machines.
 - New technologies (technological improvements) such as AI improve productivity.
 - Investment in physical and human capital could increase productivity.
3. Plot a curve that shows the number of drafted emails to customers (on the vertical axis) as a function of the AI adoptions a business makes (on the horizontal axis). Assume that each additional AI improvement increases the output at a decreasing rate. This question is asking you to show the production function.



4. The article mentions a gym owner who managed to increase his revenue in 2024 by 30% without hiring any additional salespeople. According to the article, what contributed to the success of this business?
 - a. A successful advertising campaign attracted new customers.
 - b. The gym increased the membership fee without losing many customers.
 - c. The company utilized AI to facilitate writing marketing plans, drafting emails and social-media posts.
 - d. The gym purchased a lot of new fitness equipment.
5. Consider a gym employee whose job includes drafting emails to current and potential customers and creating social-media posts. The following graph represents the production possibilities frontier (PPF) of this gym employee. The article refers to the adoption of AI to facilitate the work and increase the productivity of these workers. If AI facilitates *both* drafting emails and creating social-media posts as suggested by the article, and if the effect on creating social-media posts is larger, how would the PPF change as the gym adopts more AI? Show the effect on the PPF below.



6. The article claims that one of the reasons for the increase in productivity was that “companies learned new ways of doing things and adopted new technologies.” What are some examples of such “new ways of doing things” and “new technologies”?
7. Which of the following is a consequence of the adoption of new technologies such as AI on the labor market?
- AI could make workers more efficient and create new jobs.
 - AI could take the jobs of some workers leading companies to laying them off.
 - Both (a) and (b).
 - AI could only make workers less productive.
8. The article explains that some businesses have adopted new technologies such as AI to facilitate their processes. How does the adoption of AI (technological improvement) affect the demand for labor? *Hint:* Use concepts such as the marginal product of labor and substitutes to explain your answer.
9. True or false? Companies could increase wages if workers become more productive only if the prices of goods and services also go up.
10. In your opinion, would the increase in productivity last? Why or why not?



Answer Key

1. True or false? According to the article, productivity in the U.S., as measured by the output the average worker produces in an hour, increased by 2% in the third quarter of 2024 compared with a year earlier.

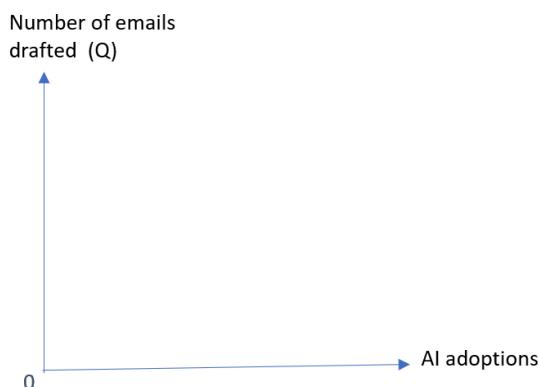
Answer: True. Productivity, or the output per worker, has been rising. The article states that “productivity—the total output of the economy divided by hours worked—rose 2% in the third quarter [of 2024] compared with a year earlier.”

2. Which of the following statements about productivity is correct? Select *all* that apply.

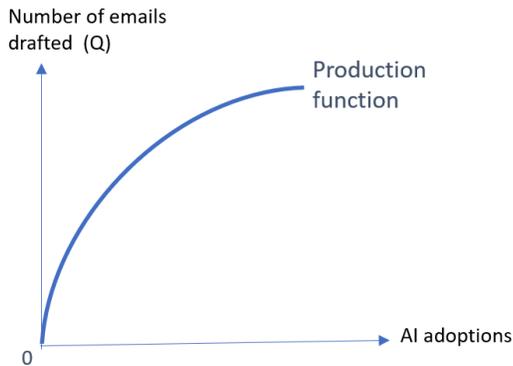
- **An improvement in productivity fosters economic growth.**
- Greater productivity always leads all companies to laying off workers.
- **Workers’ productivity improves when they use physical capital such as computers and machines.**
- **New technologies (technological improvements) such as AI improve productivity.**
- **Investment in physical and human capital could increase productivity.**

Answer: The use of physical capital such as computers and machines, investment in physical and human capital, and the adoption of new technologies such as AI improve productivity. An improvement in productivity fosters economic growth. The article explains that “the faster that productivity grows, the faster the economy can grow as well.”

3. Plot a curve that shows the number of drafted emails to customers (on the vertical axis) as a function of the AI adoptions a business makes (on the horizontal axis). Assume that each additional AI improvement increases the output at a decreasing rate. This question is asking you to show the production function.



Answer: The production function is upward-sloping. It is increasing at a decreasing rate as shown below:

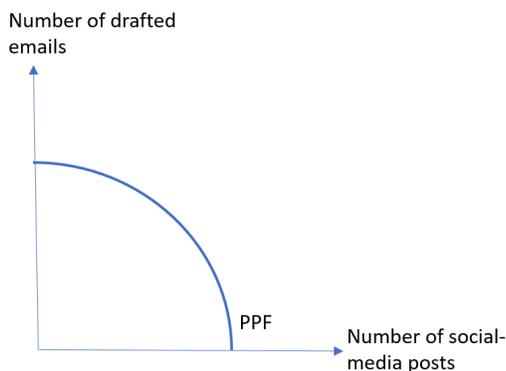


4. The article mentions a gym owner who managed to increase his revenue in 2024 by 30% without hiring any additional salespeople. According to the article, what contributed to the success of this business?

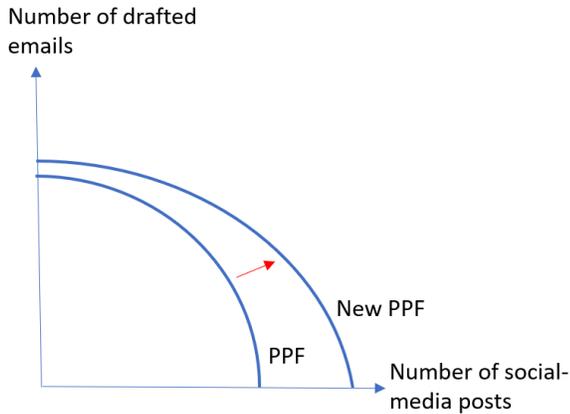
- a. A successful advertising campaign attracted new customers.
- b. The gym increased the membership fee without losing many customers.
- c. **The company utilized AI to facilitate writing marketing plans, drafting emails and social-media posts.***
- d. The gym purchased a lot of new fitness equipment.

Answer: C. The article explains that the gym owner “has been using an artificial-intelligence model loaded with company documents, sales materials and other information. Now, he can complete in just minutes work that used to take hours, such as writing marketing plans, email drafts and social-media posts.”

5. Consider a gym employee whose job includes drafting emails to current and potential customers and creating social-media posts. The following graph represents the production possibilities frontier (PPF) of this gym employee. The article refers to the adoption of AI to facilitate the work and increase the productivity of these workers. If AI facilitates *both* drafting emails and creating social-media posts as suggested by the article, and if the effect on creating social-media posts is larger, how would the PPF change as the gym adopts more AI? Show the effect on the PPF below.



Answer: The PPF would shift outward and rotate. Because the adoption of AI facilitates creating social-media posts more than it facilitates drafting emails, the shift will look as follows:



6. The article claims that one of the reasons for the increase in productivity was that “companies learned new ways of doing things and adopted new technologies.” What are some examples of such “new ways of doing things” and “new technologies”?

Answer: Companies have started to automate some processes. The article mentions that restaurants have started to use QR codes instead of paper menus. Many businesses have also chosen videoconferencing instead of asking workers to take a time-consuming trip to an office.

7. Which of the following is a consequence of the adoption of new technologies such as AI on the labor market?

- a. AI could make workers more efficient and create new jobs.
- b. AI could take the jobs of some workers leading companies to laying them off.
- c. **Both (a) and (b).***
- d. AI could only make workers less productive.

Answer: C. New technologies such as AI are good news for some workers and bad news for others. The article explains that “new technologies such as AI can create new jobs and make workers more efficient—or take their jobs.”

8. The article explains that some businesses have adopted new technologies such as AI to facilitate their processes. How does the adoption of AI (technological improvement) affect the demand for labor? *Hint:* Use concepts such as the marginal product of labor and substitutes to explain your answer.

Answer: If technological improvements such as the adoption of AI could increase the marginal product of labor, then the demand for labor would increase. Alternatively, if automation due to AI substitutes the work performed by workers, then businesses would need fewer workers, that is, the demand for labor would decrease.

9. True or false? Companies could increase wages if workers become more productive only if the prices of goods and services also go up.

Answer: False. Higher productivity makes businesses more efficient, and “a more efficient business can be more profitable and pay its workers more without raising prices.”

10. In your opinion, would the increase in productivity last? Why or why not?



Answer: Answers will vary. Some students might suggest that technology will continue to develop and make workers more efficient. Others might refer to the article and claim that the figures are “volatile and subject to revision,” and the rise in productivity isn’t “anything like the boom in the 1990s, when the wide-scale adoption of the personal computer and the advent of the internet reshaped the economy.”