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Chapter 2

Innovation and Growth

■ Chapter Overview

Innovation is necessary to transform prior inventions into something useful for our everyday lives. Profit is the incentive for businesses to innovate and, when firms are successful, our standard of living increases. It is the introduction of new products that improves our lives and it is the potential profit for businesses that leads to new investment, which contribute to economic growth. Property rights to ideas must be secure and being able to keep the fruits of one's labor are necessary in order to create the proper incentives to innovate. Governments need taxes to operate but the unintended consequence of taxing profits is that there is less incentive for firms to innovate.

■ Descriptive Analysis

Each of us today benefits from prior inventions and innovations to those inventions. We can communicate with each other or send pictures to each other from across the world; we are able to obtain information in a matter of seconds that previously took hours; we can purchase groceries, other essential home products, and even electronic "toys" that entertain us at much lower prices due to innovation. Innovation either reduces production costs, which leads to lower prices, or it brings us new goods and services that make our lives easier or give us more utility (pleasure, satisfaction).

Just because someone invents something does not mean it will automatically reach the masses. In fact, some inventions in hindsight seem to be useless or have only narrow applications. It is innovation—the process of transforming the invention—that leads to the increase in the welfare of the masses.

Innovation does not just happen by chance. In fact, inventions and innovation are a function of how much is spent on research and development (R&D). Large, private firms and government agencies spend billions of dollars on R&D trying to create new inventions, but only a few actually are created that have useful applications, and even fewer might be successful commercially. However, not all innovation is done by large firms or government. Small businesses and individuals invent and innovate, too.

Regardless of whom does the R&D, our standard of living increases when new products are brought to market and when innovation transforms already made products or lowers production costs, which lead to lower prices for consumers. These lower prices, in a very real sense, are equivalent to getting a pay raise.

Historically, when the rate of innovation was slow in the United States, the standard of living was low. However, as the rate of innovation has increased, so has the standard of living for the average American. It is innovation that is the foundation for economic growth. Innovation does not just happen in any economic system. The institutions (rules of the game) of a country affect the incentives to innovate. If there is no stable judicial system that enforces property rights such as patents, then firms and individuals

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will not have an incentive to invent or innovate. Moreover, if taxes are imposed on the profits of large firms or small businesses, then the incentive to create a better product or to innovate will be diminished.

The notion that everything important has already been invented ignores the fact that previous inventions and innovations were built on previous knowledge. So, the fact that we have more inventions and innovations today than ever before means that there is fertile ground for even more inventions and innovations that will improve and change our lives.

■ Teaching Tips

Students might not appreciate how their lives have been impacted by entrepreneurs who had an idea and made it into the "next big thing." Our lives today are so much easier and we have so many more products that entertain us, allow us to communicate more easily and more productively, or even go on dates. You can use the television show *Shark Tank* on ABC as an example. Ask your students why they think these people come on the show? (They will most likely say, "To make money!" and that's fine. It is this pursuit of money for themselves that gives others the value-enhancing goods and services.) Students might underestimate or negatively view the pursuit of profit. Some students might protest that profits are "evil" and companies take advantage of us. But then ask students if they *need* their iPhone or Sony PS4/Microsoft X-Box video game console that is currently in their hand or in their dorm room? Ask them if Apple or Sony or Microsoft *forced* them to buy their product? You can also turn the tables by asking them if they would go to work if they did not receive a paycheck. What you want your students to understand is that those firms and individuals who invent and innovate respond to incentives just like they do. This is also a good time to remind students of Adam Smith's famous quote, "It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest." It is because of their own interest, that we don't have to produce our own steak, bread, or beer that we enjoy eating and drinking.

■ Chapter Answers

1. It is better to live today. If the famous kings and queens of the past or John D. Rockefeller got sick or suffered from medical problems, they were worse off than the average person today who can get high-tech medical treatment and medicine. Individuals today can get better relief by just going to the pharmacy let alone to a physician who has much more human capital and physical capital to work with today than during the times of the kings and queens or Rockefeller.

   As far as homes, cars, communication devices, and entertainment products, the average income-earner today lives in a safer home, drives a more luxurious and safer car, can communicate both verbally and visually with anyone across the globe, and can enjoy a beautiful high-definition picture on their flat television.

2. Human beings are always thinking of new things to create or devising ways of making a better mousetrap. The problem is that just because someone invents something, it does not necessarily mean others will benefit from it. First, the invention has to be something that truly has a benefit. Moreover, in order for it to be commercially successful, it has to benefit many people. This is why innovation is necessary and not just invention.

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3. It depends on who does the spending. One can argue that government expenditures on basic research are necessary since private firms will not undertake this. On the other hand, government R&D can be wasteful since they are spending taxpayer dollars and not their own money. Therefore, the government agencies doing the R&D might not be as good of stewards with their resources. On the other hand, it can be argued that if our knowledge has increased due to R&D, even if it isn't profitable, that knowledge will make us better off and lead to more productive avenues of R&D. Of course, private firms have the financial incentive to spend time and money researching and developing products that will make a profit. And if the firm makes a profit, that is evidence that they did something right (solved a problem, alleviated suffering, created something pleasurable) since individuals cannot be forced to buy the products of the firms.

4. Economic growth has an impact on individual welfare. Even small percentage changes, due to compounding, have a large impact. So, while a small change might have a small impact on our lives in the short-run, in the long-rung our standard of living will be greatly reduced.

   There is an easy way to determine the number of years it takes for an economy to double in size. The formula is equal to 70 divided by the growth rate (the rule of 70). So, using 2.1%, it would take an economy approximately 33 years to double; however, using .9 %, it would take approximately 78 years.

5. In Nation A, the after-tax profit will be $83,000 ($100,000 x .17 = $17,000) while in Nation B it would be $93,000 ($1000, 000 x .07 = $7,000). Therefore, the preferred location is, of course, Nation B (assuming everything else is equal).

   The business is not the only one that will benefit by operating in Nation B—the citizens will also benefit. First, the business in Nation B will provide a service or product that can be directly sold to the citizens of Nation B. Second, the business will have to hire workers from among the citizenry, thereby increasing employment in Nation B. Finally, the business in Nation B will invest in physical capital and will continue to innovate which will lead to more growth.

6. Answers will vary but most likely students will list the iPhone/Android phone, popular apps like GPS navigation (Waze) and online banking, social media and dating, websites, improved video game graphics, picture quality on televisions, online education innovations, and improvements in medicine.

   It is difficult to put a precise dollar value on psychological utility, but students at least could be asked to estimate how much money they spent on the above items over the last five years. Students could be asked how much time and money they were able to save by not having to commute to all of their classes on campus or they could be asked to consider how much money they would pay to avoid the pain and suffering they would have without their medicine. Finally, if they met someone online, ask how much that is worth to them.

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