Lesson 6 – Incentives, Innovation and the Role of Institutions

Introduction

This lesson uses examples, video clips and a risk-reward mini activity to teach the relationship between innovation and economic growth.

Mini-Activity

Risk-Reward Currency Auction

Objectives

At the competition of this lesson students will be able to:

- Differentiate between invention and innovation.
- Provide examples of the costs and benefits of innovation.
- Explain the relationship between innovation, productivity and economic growth.
- Explain the role of entrepreneurship in economic growth.
- Identify institutions that encourage entrepreneurship.

Key Economic Concepts

Economic Growth	Invention	Residual Claimant
Entrepreneur	Investment	Technology
Incentives	Productivity	
Innovation	Profit	

Voluntary National Content Standards in Economics

https://www.fte.org/teachers/teacher-resources/voluntary-national-content-standards-in-economics/

STANDARD 4: INCENTIVES MATTER: People respond predictably to positive and negative incentives.

STANDARD 9: ROLE OF COMPETITION: Competition among sellers lowers costs and prices, and encourages producers to produce more of what consumers are willing and able to buy.

Competition among buyers increases prices and allocates goods and services to those people who are willing and able to pay the most for them.

STANDARD 10: INSTITUTIONS: Institutions evolve in market economies to help individuals and groups accomplish their goals. Banks, labor unions, corporations, legal systems, and not-for-profit organizations are examples of important institutions. A different kind of institution, clearly defined and well enforced property rights, is essential to a market economy.

STANDARD 13: INCOME AND PRODUCTIVITY: Income for most people is determined by the market value of the productive resources they sell. What workers earn depends, primarily, on the market value of what they produce and how productive they are.

STANDARD 14: PROFIT AND THE ENTREPRENEUR: Entrepreneurs are people who take the risks of organizing productive resources to make goods and services. Profit is an important incentive that leads entrepreneurs to accept the risks of business failure.

STANDARD 15: INVESTMENT: Investment in factories, machinery, new technology, and in the health, education, and training of people can raise future standards of living.

Materials

One $10 or $20 bill

Presentation Guidelines and Suggestions

1. Review: ERP's 3 & 4 and North's population and innovation graph (see slides).
    - Connect today's topic to the concern with poverty and economic development introduced in Lesson 1.
    - Economic growth is a sustained increase in a nation's production of goods and services.
        - Increases in productivity, as the result of investments in human and physical capital, raise incomes and standards of living.
        - Innovation – the successful introduction of technological advances – and education are the major sources of increases in productivity.
    - Evidence about the relative well-being of people in nations with different institutions – the formal and informal rules of the game that shape incentives and outline expected and acceptable forms of behavior in social interaction – tells us that institutions matter.
        - Institutions that foster economic growth are those that reward entrepreneurship for innovations that increase productivity.
    - Provide examples and pictures of how innovation changes the lives of the world's poorest people.

- Article: Mobile Phones are Transforming Africa https://www.economist.com/middle-east-and-africa/2016/12/10/mobile-phones-are-transforming-africa Great pictures and stories of how cell phones are changing the lives of the poor in Asia and Africa.

- Article: The Mobile Phone is Still Changing the Game in Africa https://qz.com/africa/1127274/one-billion-people-in-sub-saharan-africa-will-have-mobile-phones-by-2023/

- *See slides for pictures of benefits of cell phones to Africans, innovations in process that make cell phones available to poor people. (Pictures of cell phone kiosks and community phones with shared minute plans for African villages. See story in "Is Capitalism Good for the Poor?")* https://www.fte.org/wp-content/uploads/Lesson4ActivityRocketScience1.doc

- *See story of cell phones on bicycles (another innovation in process rather than product) in India in "Is Capitalism Good for the Poor?"* http://fte.org/capitalism/activities/rocket_science/distinguishing/reading2.htm

2. Technological progress makes possible wealth-enhancing increases in productivity.
   - Technology is, fundamentally, a collective body of knowledge – what human societies know and have recorded. It is not simply a collection of tools, scientific equipment, or artifacts.
   - In its basic form, technology consists of instructions for the production of goods and services. The recipes are based on human knowledge of natural phenomena; as we learn more about the physical world, we can devise better recipes and better manage our limited resources for production.
   - Technological progress occurs not at the point of invention – the discovery of new knowledge – but at the point of innovation – when an increase in productivity arises from the market-proven application of new technology.
   - Choose one or more of the following videos as examples of technological increases in productivity.

     - Video comparison of horses and various tractors over 100 yr. span: http://www.livinghistoryfarm.org/farminginthe50s/machines_plowing.html

       A tractor enables us to produce more food, and because the labor released can produce elsewhere, more of other goods.

     - Three clips to show how innovations in process and technology improve productivity.

       https://youtu.be/QGj-KkjwXJY (concrete throwing with shovels)

       https://youtu.be/EYg-cHe79hI (scaling concrete throwing

https://youtu.be/YwzelMxVkr0 (adding cement truck and buckets)

- Use the Soviet Union and the extremely high quality of its scientific research to make the case that invention is not enough. Emphasize that in order to affect people's standard of living, institutions must provide the incentives that move inventions into production through innovation and entrepreneurship.
    - *See slides of quality of life conditions and pictures of lines for shoes and oranges in Soviet Union (from Economic Demise of the Soviet Union curriculum)*

3. Invention is inextricably linked to entrepreneurship
    - Innovation occurs only when entrepreneurs recognize the implications of new technologies (knowledge) and put them into productive use.
    - The institutional framework of an economy may facilitate or inhibit this transfer of knowledge to production. The Soviet Union, for example, produced many inventions, but few innovations.
    - Economic growth occurs when a nation's institutions provide incentives for entrepreneurship.
    - Discuss what makes a successful innovation
        - Optional video: https://youtu.be/7S6k7tt-d6U (Jimmy Kimmel Pitches "Horse Pants" on Shark Tank

4. Profit, the reward for successful entrepreneurship, helps to allocate resources, including entrepreneurial talents, to their most highly-valued uses.

    Conduct the following activity:

    MINI ACTIVITY: Risk & Entrepreneurship
    Activity to highlight the risk-taking component of entrepreneurship.

    - Put a $10 or $20 bill in an opaque, sealed envelope before class.
    - Show the envelope to the clas s and explain that it contains a single piece of U.S. currency, from $1 to $100.
    - Offer to sell the envelope to the highest bidder, subject only to the requirements that 1) the winner pay cash on the spot, and 2) the winner open the envelope to show everyone the contents.
    - Ask the auction winner:
        - What motivated you to accept the risk? (*Answer: the potential profit*)

        This is a particularly powerful activity if you have also conducted the paper auction in lesson 4, where the $5 in the clear bag probably sold for $4.95 to $5.00 because there was no risk involved.

- Suppose I repeated the sale, hour after hour, putting a $10 bill in the envelope every time, to what would the winning bid tend to gravitate? (*Answer: Winning bid would approach $10, driving profit toward zero)*

> Note from Dan Benjamin on past experience with the activity: *I prefer a $20 bill here because they are reluctant to bid more than $10. Putting a $5 in is likely to elicit a loss due to overbidding (they seem to sense that the deal will offer them SOME compensation for risk and so I am likely to pout more than a $1 in). The prospect that I might be a hard as I appear seems to make $20 a bridge too far for them. So I get lots of tension during the bidding and then lots of excitement when the risk-taker turns out to win big.*
>
> *Of course, if I have someone in the class who is alienating others by trying to dominate or derail sessions, I am not averse to putting a $5 or even a $1 in the envelope, figuring he will win it (delighting others with his misfortune), enabling me to talk about the very real risks of entrepreneurship.*

- Conclude: Profit encourages risk-taking (entrepreneurs). It attracts resources and competition. *See cartoon slide of profit as a resource magnet.*

- Economists distinguish between labor and entrepreneurship. Entrepreneurs are investors, risking their resources in the present with the expectation of future *profits*. They organize the activities of others, including laborers, in productive endeavors.
  - Laborers, who do not bear the risks of production or the promise of future rewards, trade their time and talents for *wages*.
- Because entrepreneurs are responsible for the ultimate outcome of investments, they are also known as "residual claimants."
  - As risk-takers, they claim the "residual" – what remains after all the costs of production have been paid. This residual is called "profit."
    - Successful investment leaves a positive "residual" – or profit.
    - Profit acts as a magnet, drawing in other resources, including competing entrepreneurs.
    - Unsuccessful investment leaves the entrepreneur with bills to pay; the "residual" he claims is a loss.
      - Losses discourage further investment, freeing up resources, including entrepreneurial talents, for more highly valued uses.
- Innovative entrepreneurs must be willing to bear the risks of production, gaining from profits and learning from losses.
  - Profitable innovations attract resources, but also attract competitors.
  - Increased competition reduces profits and encourages an on-going search for improved products and lower-cost methods of production.
  - Unprofitable innovations create information about what is valuable in a market or economy – *and* what is <u>not</u> valuable!
  - Note that the innovative process is a classic example of the famous economic dictum: Profit is the motivator, competition is the regulator.

5. Innovation creates a dynamic economy.
    - Entrepreneurs who successfully innovate create wealth. They also pose challenges to others affected by the innovations.
    - Existing products and services can become obsolete or inefficient in the face of more innovative products or services.
    - Owners of existing products or services are provided incentives to innovate in the presence of other innovative competitors; otherwise, their wealth will be adversely affected as their resources lose value.
    - The on-going market challenge presented by new innovations is known as "creative destruction".

6. Innovation requires investment in both human and physical capital.
    - Investment is the willingness to forego consumption now in anticipation of greater rewards in the future.
    - Investment is risky, so the "future rewards" must be sizable enough to compensate for the risks.
    - Investment decisions are made by comparing the risks and the potential rewards: the greater the risk, the greater the potential reward necessary to convince the entrepreneur to act.
    - Tie back to discussion in earlier lessons on decision-making based on perceptions of costs and benefits.
7. Nations with institutions that encourage entrepreneurship also encourage the innovation that leads to economic growth and rising standards of living.
    - Entrepreneurial innovation leads to improvements in product quality at generally lower costs and market prices.
    - Governmental institutions may encourage or discourage growth-producing innovation:
        - Stable property rights and well-enforced rule of law attract entrepreneurship. Optional Video: Lars Ulrich, lead drummer for Metallica, testifying to congress on Napster Case. http://www.econedlink.org/interactives/index.php?iid=193&type=educator
        - Particularly important in reducing risk for entrepreneurs is the government's record of enforcement of multi-period contracts.
        - Business taxes, regulations, and poorly-protected property rights discourage entrepreneurship by reducing return on or increasing the risk of investment – or both.
        - *See slides from World Bank yearly report on Ease of Doing Business to point out correlation between inhibiting entrepreneurship and poverty. http://www.doingbusiness.org/economyrankings/*
        - Optional Resource: Global Entrepreneurship Monitor Report: https://www.gemconsortium.org/

8. Highlight the **Economic Reasoning Principles** that formed the basis for this lesson and connect them to the problem of economic growth.

   - Highlight proposition 5, reminding students that the evidence presented here, in the form of maps, charts, and even the stories, supports the argument about the importance of institutions in helping the poor.

     ERP-3: People respond to incentives in predictable ways.

     Choices are influenced by incentives, the rewards that encourage and the punishments that discourage actions. When incentives change, behavior changes in predictable ways.

     ERP-4: Institutions are the "rules of the game" that influence choices.
     Laws, customs, moral principles, superstitions, and cultural values influence people's choices. These basic institutions controlling behavior set out and establish the incentive structure and the basic design of the economic system.

     ERP-5: Understanding based on knowledge and evidence imparts value to opinions.
     Opinions matter and are of equal value at the ballot box. But on matters of rational deliberation the value of an opinion is determined by the knowledge and evidence on which it is based. Statements of opinion should initiate the quest for economic understanding, not end it.

Conclusion

- New ideas, products and processes that pass the test of the market are considered innovations.
- Innovation is the key to increased productivity and economic growth.
- Institutions that reward entrepreneurship create incentives for more innovation.
- The economic changes that result from ongoing innovation impose costs and create benefits. Historical evidence, in the form of the increasing wealth of nations that support entrepreneurship, supports the contention that the benefits greatly outweigh the costs.