

2014–2015 Student Essay Contest

Economic Inequality



This spring the Minneapolis Fed held its 27th Annual Student Essay Contest, which is open to all high school students in the Ninth Federal Reserve District. The contest drew 269 essays from schools throughout the district. The winning essay is published here. Other top essays can be found at minneapolisfed.org under the Student Resources section of the Community & Education tab.

Thirty finalists each received \$100. The third-place winner received an additional \$200, and the second-place winner an additional \$300. The first-place winner, Solomon Polansky of the Blake School in Minneapolis, received an additional \$400 and was offered a paid summer internship at the Minneapolis Fed.

Economic inequality

Inequality takes many forms: racial, gender and political, to name a few. Among them, economic inequality—the unequal distribution of the national economic “pie” across different households—has gained a lot of attention in recent years. That is due in part to a wealth of new research on the topic that demonstrates that inequality has increased over the past generation.

Though other forms of inequality are important, contest entrants were asked to write specifically about economic inequality. And rather than debate the moral or political aspects of the question, they were asked to think like economists about the causes of economic inequality. Indeed, some essays focused on other forms of inequality as determinants of economic inequality.

Student Essay Contest Winner

An Analysis of the Impact of Technology on Income Inequality

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Luddite (n.): “broadly, one who is opposed to especially technological change.”¹ Luddite finds its origin from a certain Ned Ludd, who smashed two knitting machines in early 19th century England to protest the developing frontier of technology and its effect on the workforce.² The Luddites’ concerns are not without merit and remain relevant today in the United States. Over the past 30 years, U.S. productive output has soared while the number of labor hours has remained constant.³ During this same time period, the top 1 percent of income earners doubled their percentage of income, while the bottom 90 percent fell from 70 percent to 60 percent.⁴ Ongoing technological advances enable these productive strides, but also drive increasing income inequality by spawning two very distinct groups of winners and losers: those who benefit from technology, such as inventors of technology and workers whose productivity is enhanced by technological advance, and those who are negatively impacted through substitution of labor by technology.⁵

Inventors of new technology are the first to benefit from that new technology. In a free market, individuals are compensated based on the economic output of their factors of production. These factors of production include physical holdings (land, money) as well as intangibles (labor time, creativity). If an entrepreneur or inventor can successfully develop and market a desirable invention, the market will reward him/her by offering tremendous profits. Note that this unequal distribution of income is not necessarily a bad thing for the economy—in fact, the U.S. government openly supports new innovation by offering patents through the Patent and Trademark Office, thereby granting a (time-limited) legal monopoly (and the monopoly profits that follow).⁶ But once an inventor earns these large incomes, the wealth inequality over others is unlikely

to dissolve easily. There is a “snowballing effect on wealth distribution: top incomes are being saved at high rates, pushing wealth concentration [further] up,” perpetuating the cycle of inequality.⁷ While by no means will every inventor “strike gold” with his/her invention (in fact, most do not succeed), a skilled and lucky few will reap tremendous income; thus, propelling them into the highest echelon of income.⁸ In short, “the people who benefit most are those with the expertise and creativity to use these advances.”⁹ And that drives both the incentive to invent and income inequality.

Skilled employees who use technology as a “tool” to increase their productivity also benefit. Consider highly skilled hedge-fund managers: These managers are already making a good income and would not be replaced with a computer (as of current technology) because they use human judgment to select investments. However, they become much more productive (and profitable for the firm) with the addition of computerized data and the skill to use it. Thus, their marginal revenue has increased, and the price the firm will be willing to pay, in salary, will also increase. These traders’ incomes therefore increase with the addition of technology.¹⁰ As technology is applied to skilled jobs (which are already high paying), the productivity of those workers increases and their income increases too, further extending the income inequality between skilled and unskilled laborers.¹¹

However, not everyone benefits from advances in technology; laborers whose jobs can be substituted by technology are negatively affected. Businesses, by investing in capital such as new technology, will increase outputs while decreasing labor inputs (e.g., automation where purchasing a robot will replace a human worker). The Bureau of Labor Statistics reports that manufacturing employees’ real output per hour increased from 51.2 units (which is proportional to dollars) per hour in 1990 to 110.3 in 2013; businesses produced 42 percent more output in 2013 than 1998.¹² However, the

total number of manufacturing workers actually decreased from 17.4 million in 1990 to 12.1 million in 2013.¹³ A few skilled, knowledgeable employees are required to operate these advanced, high producing machines—in contrast to the hordes of unskilled laborers they replace.¹⁴ In the early phases of technological development, it was largely simple manufacturing work being replaced by technology, as manufacturing firms sought to cut costs.¹⁵ But now, with the advent of “big data” and analytical tools, even clerical work and professional services (both traditionally secure, white collar jobs) are being rendered obsolete by technology.¹⁶ Technology leads companies to, inevitably, eliminate the workers whose labor has been replaced by a more efficient process in order to remain competitive in their markets. Thus, these workers’ income has dropped to zero, forcing them into other lower-skill industries, such as food and restaurant services, that already have an ample supply of workers and thus driving wages downward.¹⁷ Additionally, rapid globalization, enabled by advances in technology in transportation and communication, has opened up cheaper foreign labor markets for U.S. companies, further eroding the domestic manufacturing base.¹⁸

Applying technology to the economy thus creates both “winners” and “losers.” It enables entrepreneurs and inventors, people with natural creativity and determination, to have the chance for great profits. It also increases the productivity (and therefore, income) of those whose “jobs are enhanced by machines”; these groups are the “winners.”¹⁹ However, technology eliminates the jobs of less-skilled (already lower-paid) workers by providing a more productive, albeit less “human,” alternative and forcing workers into lower-paying service jobs; these workers are the “losers.”²⁰ There is a clear schism widening between those benefiting and those being harmed by technology, and it is reflected in increasing income inequality. Ned Ludd was right to be concerned, and there is no easy answer to closing the gap. **R**

Endnotes

¹ Merriam-Webster.com. Accessed Nov. 23, 2014. merriamwebster.com/dictionary/luddite

² Porter, Eduardo. 2014. “Tech Leaps, Job Losses and Rising Inequality.” *New York Times*, April 15. nytimes.com/2014/04/16/business/economy/tech-leaps-job-losses-and-rising-inequality.html?_r=0

³ Sprague, Shawn. 2014. “What Can Labor Productivity Tell Us About the U.S. Economy?” *Beyond the Numbers* 3 (12). Bureau of Labor Statistics. bls.gov/opub/btn/volume-3/what-can-labor-productivity-tell-us-about-the-us-economy.htm

Workers in U.S. businesses worked the same number of labor hours (194 billion) in 2013 as in 1998, yet productive output increased 42 percent over that same time frame.

⁴ Saez, Emmanuel, and Gabriel Zucman. 2014. “Wealth Inequality in the United States Since 1913: Evidence from Capitalized Income Tax Data.” Working Paper 20625. National Bureau of Economic Research. gabriel-zucman.eu/files/SaezZucman2014.pdf

⁵ This paper will address income inequality primarily. However, income inequality goes hand in hand with wealth inequality, as excess income allows one to invest in other capital, such as stocks and bonds, leading to the accumulation of wealth.

⁶ U.S. Patent and Trademark Office. Accessed Nov. 21, 2014. uspto.gov/about/index.jsp

⁷ Rotman, David. 2014. “Technology and Inequality.” *MIT Technology Review*. Oct. 21. technologyreview.com/featuredstory/531726/technology-and-inequality/

⁸ For a real world example of the potential for inventors, consider Bill Gates, founder of Microsoft. Rotman refers to these individuals as technology “superstars” who invent new technologies or generate new ideas for creative uses of technology.

⁹ See Saez and Zucman.

¹⁰ *The Economist*. 2012. “Who Exactly Are the 1%?” Jan. 21. economist.com/node/21543178

¹¹ Acemoglu, Daron. 2003. “Technology and Inequality.” *NBER Reporter*. National Bureau of Economic Research. nber.org/reporter/winter03/technologyandinequality.html

¹² See Sprague.

¹³ See Sprague.

¹⁴ See Acemoglu.

¹⁵ Katz, Richard, Robert Z. Lawrence and Michael Spence. 2011. “Manufacturing Globalization: The Real Sources of U.S. Inequality and Unemployment.” *Foreign Affairs*. Council on Foreign Relations. November/December. foreignaffairs.org/articles/north-america/2011-11-01/manufacturing-globalization

¹⁶ See Rotman.

¹⁷ See Sprague. While the number of manufacturing jobs has decreased from 1990 to 2013, the number of food and restaurant service workers has increased from 6545.3 to 10487.1 (in thousands) during that same time period.

¹⁸ Reich, Robert B. “How to Shrink Inequality.” *The Nation*. May 26. thenation.com/article/179715/how-shrink-inequality

¹⁹ See Porter.

²⁰ See Porter.