



## Examining the “Lump of Labor” Fallacy Using a Simple Economic Model

[Scott Wolla, Ph.D.](#), Economic Education Coordinator

### GLOSSARY

**Automation:** Automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human labor.

**Capital resources:** Goods that have been produced and are used to produce other goods and services. They are used over and over again in the production process. Also called capital goods and physical capital.

**Complement (resources):** Productive inputs that are used jointly with other inputs in the production process.

**Human capital:** The knowledge and skills that people obtain through education, experience, and training.

**Income:** The payment people receive for providing resources in the marketplace. When people work, they provide human resources (labor) and in exchange they receive income in the form of wages or salaries. People also earn income in the forms of rent, profit, and interest.

**Labor:** The quantity and quality of human effort directed toward producing goods and services. Also known as human resources.

**Labor force:** The total number of workers, including both the employed and the unemployed.

**Substitute (resource):** Productive inputs that can be used in place of one another.

**Technological advance:** An advance in overall knowledge in a specific area; also known as technological change.

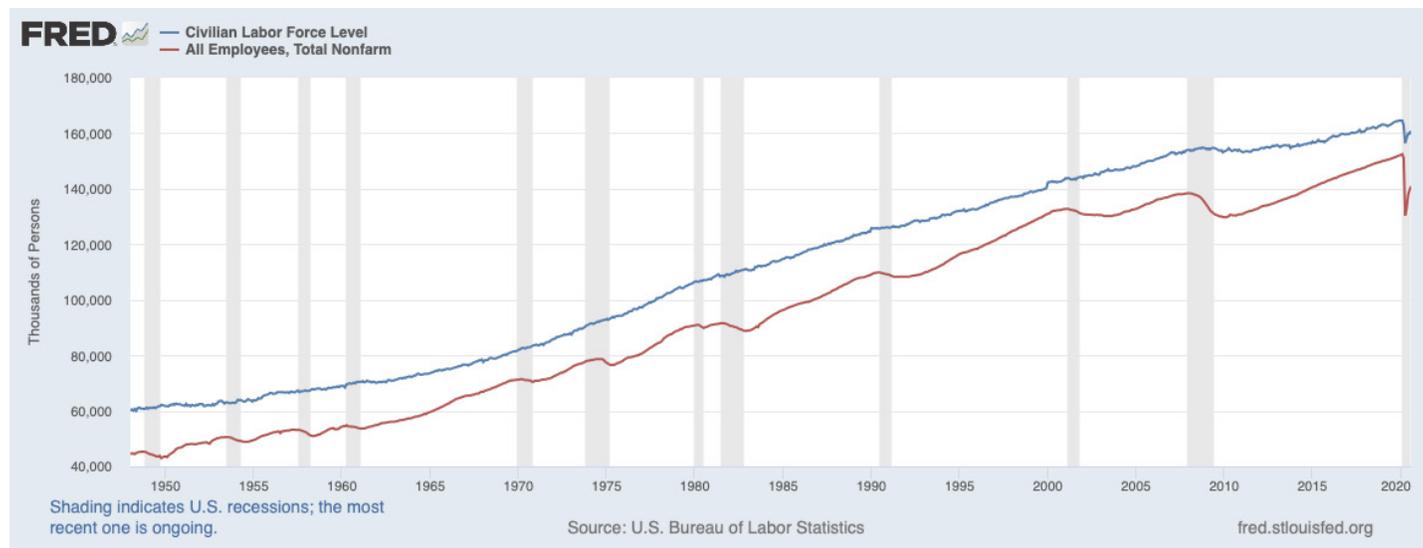
“Our machines increasingly do our work for us. Why doesn’t this make our labor redundant and our skills obsolete? Why are there still so many jobs?  
—David Autor<sup>1</sup>

“Lump” and “**labor**” are two words that people don’t normally put together. However, the “lump of labor” fallacy is evident in many people’s thinking. The lump of labor fallacy is the assumption that there is a fixed amount of work to be done. If this were true, new jobs could not be generated, just redistributed. Those who believe the fallacy have often felt threatened by new technology or the entrance of new people into the **labor force**. These fears are rooted in a mistaken zero-sum view of the economy, which holds that when someone gains in a transaction, someone else loses. It’s a tempting idea to some because it seems to be true. For example, jobs can be lost to **automation** and immigration. However, that is not the full story. In reality, the demand for labor is *not* fixed. Changes in one industry can be offset, or overshadowed, by growth in another. And as the labor force grows, total employment increases too (Figure 1). This article provides two lessons that refute the lump of labor fallacy and explains a simple economic model that shows how the economy functions, shedding light on how technology and immigration can increase standards of living.

### Lesson One: Job Losses in One Industry Can Support Growth in Other Industries

Machines, robots, and artificial intelligence are completing tasks that had been performed by human workers. The lump of labor fallacy would say that automation displaces human workers and results in fewer jobs. According to a 2017 Pew Research survey, this is a common fear: 72 percent of respondents expressed worry that robots and computers will take over many human jobs.<sup>2</sup> Anxiety about automation is nothing new. In 1589, Queen Elizabeth of England refused to grant the inventor of a mechanical knitting machine a patent, fearing it would put knitters out of work.<sup>3</sup> Luddites, textile workers in the early nineteenth century, attempted to prevent mechanization of their industry. Even the famous economist John Maynard Keynes worried about technology causing unemployment.<sup>4</sup> Thankfully, these fears did not become reality.

Figure 1  
The Labor Force and Employment



The labor force has grown consistently over time, and the number of jobs has grown as well, although with more variance due to business cycle effects.

SOURCE: FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?g=qXmO>, accessed September 23, 2020.

History provides an interesting example of automation displacing labor: In the year 1900, 41 percent of the U.S. workforce worked in agriculture. After a century of technological change in that industry, the number stood at 2 percent (in the year 2000). This transformation changed the work of farmers in dramatic ways, but it did not reduce total employment in the United States. As it happens, the mechanization of agriculture in the early twentieth century made possible the large increase in employment in new industry and factory jobs,<sup>5</sup> a growing farm equipment industry,<sup>6</sup> and cotton milling.<sup>7</sup> So, automation can be a **substitute** for labor, but it is also a **complement** to labor. In doing so, it raises output in ways that can increase the demand for labor.<sup>8</sup> Without the new factory jobs, such as in production, engineering, accounting, supervision, and management, in the latter half of the nineteenth and twentieth centuries, it would have been impossible to employ the millions of people exiting the agricultural sector and other labor-intensive jobs as automation replaced their jobs.<sup>9</sup> Our first lesson, then, is that labor is a valuable economic resource: In a dynamic economy, job losses in a diminishing industry frees labor resources to move into other growing industries.

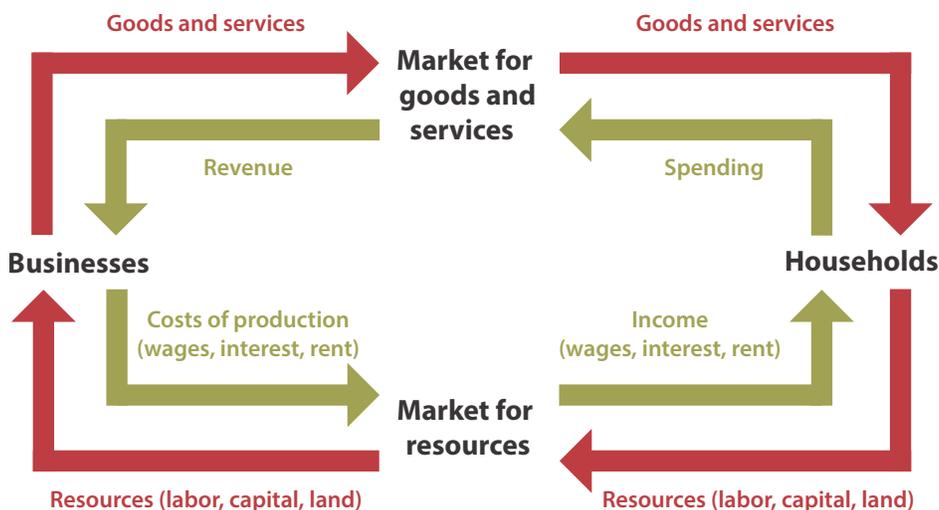
So, what guarantees that if one industry declines, others will grow? The answer is human wants—which are infinite. Indeed, many of the goods that we spend our money on now did not exist a century or even a few decades ago. And, many of the industries in which many people work today didn't exist a century ago. As Thorstein Veblen said, "invention is the mother of necessity."<sup>10</sup>

### Lesson Two: The Size of the Economic "Pie" Is Not Fixed

Imagine the economy is a pie. According to the lump of labor fallacy, the size of this pie is fixed. For one person to get a bigger piece, the other pieces (by definition) would need to get smaller. Economists, however, often point out that the economy is *not* fixed—it is dynamic and expands over time. The individual pieces of the pie can get bigger together.

Economies grow as productive resources (such as labor or **capital resources**) are added: That is, more inputs (resources) increase the output produced. Economies also grow when productivity increases: That is, they grow when *output per input* increases. For example, the same automation that might displace workers in a particular industry might also contribute to rising productivity in that industry and thus the economy overall. Also, as workers

Figure 2  
The Circular Flow Model



acquire education and training, they contribute to a more productive economy. So, our second lesson is that the economy does not have a fixed size—it grows. And a growing economy increases the likelihood that job opportunities and standards of living will increase over time.

To get to the bottom of the lump of labor fallacy, we must start by thinking about where jobs come from. Economics teaches us that the demand for labor is derived from—or determined by—the demand for the goods and services that labor produces. So, an increase in the demand for cars results in an increase in the demand for autoworkers. Likewise, as consumers demand fewer of certain goods and services, the demand for workers in those industries diminishes. Now, let's use a simple economic model to help us think about whether labor is a fixed lump.

### The Circular Flow Model

The economy is complex and can be difficult to understand. Luckily, economists have developed models to help us understand how the economy functions. One of the most basic and useful models is the circular flow model. The circular flow model (Figure 2) highlights the “flows” within the economy—the flow of economic resources, the flow of goods and services, and the flow of money. The model includes only two markets: the market for resources and the market for goods and services. It also includes two groups of economic decisionmakers: households and businesses.

Let's start with the decisionmakers. Households, on one side of the model, own the economic resources—labor, capital, and land (natural resources)—and they want to buy goods and services. Businesses, on the other side of the model, use economic resources to produce goods and services, and they want to sell those goods and services to households.

Households and businesses interact in the two markets. The market for resources is where households sell economic resources—labor, capital, and land—to businesses so businesses can produce goods and services. Households receive wages for their labor, interest for the use of their capital, and rent for the use of their land. These payments are **income** for households. So, in the market for resources, households sell economic resources and businesses buy economic resources: Resources flow one way (to businesses) and money flows the other (to households).

The market for goods and services is where businesses sell goods and services to households. Households obtain money to buy goods and services from the income they earn in the market for resources. The payment businesses receive for selling goods and services is called revenue. So, in the markets for goods and services, businesses sell goods and services and households buy goods and services: Products flow one way (to households) and money flows the other (to businesses).

So, what does the circular flow model have to do with the lump of labor fallacy? Well, imagine that new workers

enter the model. These workers might be immigrants who establish new households or members of existing households who enter the workforce (such as more women have since the 1960s and new graduates do each year). These workers interact in the two markets in the same way the original workers did—they sell their valuable labor resources in the market for resources and earn income, and they spend their income in the market for goods and services. The extra spending in the goods and services market creates additional demand for those goods and services. In turn, the increase in demand for goods and services increases the demand for the labor that produces them. In other words, new jobs are created.

The lump of labor perspective incorrectly assumes that the demand for labor, which is determined in the market for goods and services, will remain constant even when the supply of workers increases. But that's not how the model—or the real economy—works, because the markets are connected. Income earned by workers in one market becomes revenue for businesses in the other. And the production of additional goods and services creates additional demand for workers.

### Models vs. Reality

Economic models are simplified versions of reality intended to make complex ideas easier to understand. In simplifying concepts, however, some of the finer points can be missed. So, let's discuss a few important economic effects of automation and immigration. Generally speaking, both automation and immigration provide benefits to the economy, but that does not mean that every individual in the economy will be better off.

Automation affects workers in different ways. In some cases, technology acts as a complement to human labor, and in other cases as a substitute for human labor. Over the long run, **technological advance** creates new goods and services, raises national income, and increases the demand for labor throughout the economy. However, it is important to note that these changes can create winners and losers—some workers will lack the skills to transition to new jobs. Recent technological advance has increased the demand for highly skilled workers, whose labor is a complement to the new technology, but the new technology has replaced the labor of some less-skilled workers.<sup>11</sup> Therefore, it's important that workers invest in

their **human capital** and continue to improve their skills throughout their working years.

Immigration also affects workers differently. The United States, a nation of immigrants, has absorbed wave after wave of new peoples and has enjoyed economic growth and rising standards of living over its history. Currently, foreign-born workers make up about 17 percent of the labor force.<sup>12</sup> And the benefits extend beyond immigrant workers—business owners benefit from lower labor costs and a larger customer base. In many cases, those lower labor costs translate to lower prices for consumers.<sup>13</sup>

When the jobs of native-born workers complement the jobs of immigrant workers, there is potential for job creation and higher wages for the native born. For example, the supply of immigrant labor has decreased the cost of construction and presumably increased the number of structures built. This increase in construction overall has increased the demand for higher-skilled construction workers, such as contractors, electricians, plumbers, construction managers, cost estimators, accountants, and civil engineers—all of which are predominantly native-born workers whose jobs complement those of immigrant labor.<sup>14</sup> Other research shows that the decline in the cost of childcare and housekeeping provided by immigrant labor has increased the labor supply of native-born women.<sup>15</sup>

Not everyone is always better off from immigration, however. When an immigrant worker can substitute for a native-born worker, the latter can lose a job or see lower wages. Such substitution occurs primarily on the two ends of the skills spectrum. At the low skilled end of the spectrum, 27 percent of foreign-born workers lack a high school diploma, making them more likely to perform low-skill jobs. Immigrants also make up a significant portion of the high-skilled labor force; for example, 32 percent of computer programmers and 26 percent of physicians are foreign born.<sup>16</sup>

### The Short Run and Long Run

The circular flow model helps us see that in the short run, spending determines employment and that the demand for labor is derived from the demand for the goods and services labor produces. But the adjustments aren't always smooth. For example, workers who have specialized skills who lose their jobs to technological advance

or immigration might become detached from the labor force. Or, they might have to move and start all over in another industry or another region. For example, it's likely that some of the farmers described earlier in this article found the transition to factory work (or other jobs) to be less satisfying and perhaps less rewarding than their previous profession. However, in the long run, the number of jobs is more-or-less determined by the number of people who want to work. Economic theory suggests that if wages are too high to employ everyone who wants to work, then either wages will fall or technology will improve productivity until employers do want to hire everyone. In short, both immigration and technological advance provide benefits to the economy generally, but they can make some individual workers worse off.

## Conclusion

The lump of labor fallacy is the assumption that there is a fixed amount of work to be done. This assumption can create anxiety about new entrants to the labor market and automation. This article provided two strategies for thinking about labor. First, because labor is a valuable resource, jobs lost in one industry due to technological advance will usually be absorbed by other (expanding or new) industries. Second, the size of the economic pie is not fixed—it grows. As the circular flow model shows, when workers are added to the economy, the additional income they earn is spent on goods and services, which increases demand for those goods and services and for the labor that produces them. As a result, labor is not a fixed lump. Rather, labor is determined by the underlying demand for the goods and services produced by the labor. In the long run, the number of jobs will increase with the size of the labor force and the economy. ■

## Notes

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- <sup>2</sup> Smith, A. and Anderson, M. "Automation in Everyday Life." Pew Research Center, October 4, 2017; <http://www.pewinternet.org/2017/10/04/automation-in-every-day-life/>.
- <sup>3</sup> Ip, G. "Workers: Fear Not the Robot Apocalypse." *Wall Street Journal*, September 5, 2017; <https://www.wsj.com/articles/workers-fear-not-the-robot-apocalypse-1504631505>.
- <sup>4</sup> Keynes, J.M. "Economic Possibilities for our Grandchildren (1930)," in *Essays in Persuasion*. Macmillan, 1933, pp. 358-73.
- <sup>5</sup> Acemoglu, D. and Restrepo, P. "Artificial Intelligence, Automation and Work." NBER Working Paper 24196, National Bureau of Economic Research, 2018; <https://www.nber.org/papers/w24196.pdf>.
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- <sup>8</sup> Autor, D. "Why Are There Still So Many Jobs? The History and Future of Workplace Automation." *Journal of Economic Perspectives*, 2015, 29(3), pp. 3-30.
- <sup>9</sup> Acemoglu, D. and Restrepo, P. "Artificial Intelligence, Automation and Work." NBER Working Paper 24196, National Bureau of Economic Research, 2018.
- <sup>10</sup> Veblen, Thorstein. *The Instinct of Workmanship*. B.W. Heubsch, Inc., 1922 (originally published 1914).
- <sup>11</sup> Autor, D. and Dorn, D. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market." *American Economic Review*, 2013, 103(5), pp. 1553-97.
- <sup>12</sup> "Civilian Labor Force Level - Foreign Born." U.S. Bureau of Labor Statistics and FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph?g=qVvS>.
- <sup>13</sup> Orrenius, Pia and Zavodny, Madeline. "From Brawn to Brains: How Immigration Works for America." Federal Reserve Bank of Dallas *2010 Annual Report*; <https://www.dallasfed.org/~media/documents/fed/annual/2010/ar10.pdf>.
- <sup>14</sup> Siniavskaia, Natalia. "Immigrant Workers in the Construction Labor Force." Housing Economics.com, January 2, 2018; <https://www.nahbclassic.org/generic.aspx?sectionID=734&genericContentID=260375&channelID=311>.
- <sup>15</sup> Orrenius and Zavodny (see footnote 13).
- <sup>16</sup> Zong, J. and Batalova, J. "College-Educated Immigrants in the United States in 2014." Migration Policy Institute, February 3, 2016; <https://www.migrationpolicy.org/article/college-educated-immigrants-united-states>.

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Name \_\_\_\_\_ Period \_\_\_\_\_

Federal Reserve Bank of St. Louis *Page One Economics*®:**“Examining the ‘Lump of Labor’ Fallacy Using a Simple Economic Model”****After reading the article, answer the following questions:**

1. The lump of labor fallacy rests on which assumption?
  - a. The number of jobs increases at a steady rate over time.
  - b. New jobs cannot be generated; they can only be redistributed.
  - c. The number of jobs in an economy grows with the labor force.
  - d. New jobs can be generated if the number of resources increases.
  
2. According to the lump of labor fallacy, if the economy were a pie, which of the following would be correct?
  - a. The size of the pie is fixed, so for one piece to get larger, other pieces must get smaller.
  - b. The size of the pie is shrinking, so the pieces are getting smaller over time.
  - c. The size of the pie is growing, so the pieces are getting bigger over time.
  - d. The size of the pie is not important; the quality of the pie is what matters.
  
3. How did automation affect farmers?
  - a. Automation substituted for human labor, reducing the number of farm workers needed to produce crops.
  - b. Automation complemented human labor, increasing the number of farm workers needed to produce crops.
  - c. Automation eliminated the need for human labor in farming.
  - d. Automation did not change the amount of human labor needed for farming; it just made farmers’ lives better.
  
4. Who owns all economic resources?
  - a. Households
  - b. Businesses
  
5. What payment do households receive in exchange for labor?
  - a. Income
  - b. Revenue
  - c. Costs of production
  - d. Rent
  - e. Interest

6. According to the circular flow model, how do households participate in the two markets?
  - a. They buy the stuff they want in the resource market and sell their labor in the goods and services market.
  - b. They buy the stuff they want in the goods and services market and sell their labor in the resource market.
  - c. They sell the stuff they want in the goods and services market and buy labor in the resource market.
  - d. They sell the stuff they want in the resource market and buy labor in the goods and services market.
  
7. How does the circular flow model help people see the error in believing there is a fixed lump of labor?
  - a. Adding new people into the model means they can only have a job if they take it from someone else. So, there are more households, not more jobs.
  - b. Adding new people into the model means that there are more firms and production increases. So, there are more goods and services, but not more households.
  - c. Adding new people into the model does not change the demand for goods and services; it only changes the supply of labor.
  - d. Adding new people into the model increases the supply of labor and increases the demand for goods and services.
  
8. In the short run, what determines the demand for labor (and the number of jobs)?
  - a. The demand for labor is determined by the demand for the goods and services that labor produces.
  - b. The demand for labor is determined by government planners who decide who will work and in what industries.
  - c. The demand for labor is fixed, and jobs are simply redistributed between different industries based on which companies want workers.
  - d. The demand for labor is determined by whether the economy is expanding or in a recession.
  
9. In the long run, which of the following is correct?
  - a. The number of jobs is determined by the number of people who want to work.
  - b. The number of jobs is determined by the amount of money spent by government on jobs programs.
  - c. The number of jobs is fixed and redistributed between employers based on their wants.
  - d. The number of jobs is diminishing, which is why one famous economist said, "In the long run, we are all dead."
  
10. What is the difference in the short run and long run?
  - a. In the short run, displaced workers will have difficulty finding a new job.
  - b. In the short run, everyone who wants a job will find one.
  - c. In the short run, wages adjust to a level where everyone who wants a job will find one.
  - d. In the long run, displaced workers will have difficulty finding a new job.