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Blaming It on Computers: Working Harder and Getting Paid Less?

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Abstract

Computers are often blamed for widening the economic disparities in the U.S. Many IS researchers and practitioners claim that information technologies are value-neutral. Indeed, computers have benefited everyone by enabling business firms to improve their efficiency and produce better products and services. However, critics suggest that computers have improved efficiency at the expense of widening the gap between rich and poor. Do computers really favor the affluent at the expense of others? I explore this question in this paper and present what IS professionals could say about computers and the income inequality. In particular, I describe how computers that are used to improve the efficiency end up unintentionally widening the inequality. In addition, I also describe why it has been so difficult to empower the economically disadvantaged workers using computers.

Keywords: Economic impact of computers, Social aspects of computing, Differential impact of computers, Income inequality, The U.S. economy

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Blaming It on Computers: Working Harder and Getting Paid Less¹

Introduction

Is the gap between rich and poor widening in the U.S.? This question is spurring many debates between conservatives and liberals. In this public discourse, computers are often blamed for contributing to this economic inequity. Many IS professionals—researchers and practitioners alike—claim that computers are value-neutral. Indeed, we would like to think that computers benefit everyone. However, these debates challenge this basic belief.

Do computers really favor the affluent at the expense of others? I explore this question in this paper and present what IS professionals could say about computers and the income inequality.

Productivity Gains and Income Inequality

First, before we examine whether or not computers have contributed to any economic disparities, we need to understand the basic arguments in these debates concerning income inequality. In particular, computers are widely used to improve the productivity of business firms. I will begin with how the “benefits” of productivity gains have been distributed among people.

Theoretically speaking, increased productivity—producing more goods and services using the same amount of input, such as labor hours—could be unilaterally beneficial. For example, consider a utopian scenario where a brand-new technology suddenly makes it possible for one person to perform the work of 1,000 people. A worker would be able to produce in 2 minutes and 24 seconds what he or she used to produce in a 40-hour workweek. If an average American worker chooses to work 40 hours per week with this new technology, he or she would be able to make, approximately, \$607,200 in that time period.² This exaggerated scenario demonstrates a truly utopian view of how technological innovations could ultimately transform our society and enhance people’s lives, allowing them to have more free time while still affording a high standard of living.

Unfortunately, the reality of how productivity gains have affected an average worker has been quite different from this ideal scenario. Indeed, during the period of 1986-2000, overall labor productivity in the U.S. has steadily risen by a total of 26.3 percent (see figure 1). For every hour that Americans spend at work, they are producing 26.3 percent more products and services than they produced in 1986. Despite this increase in productivity, inflation-adjusted wages and salary compensation—including fringe benefits such as health insurance—actually *decreased* by 4.8% since 1986.

¹ The author would like to express his gratitude to Kalle Lyytinen for his insightful comments on an earlier version of this paper.

² Average hourly compensation for a private industry worker, excluding any benefits, was \$15.18 in 2001 according to Bureau of Labor Statistics.

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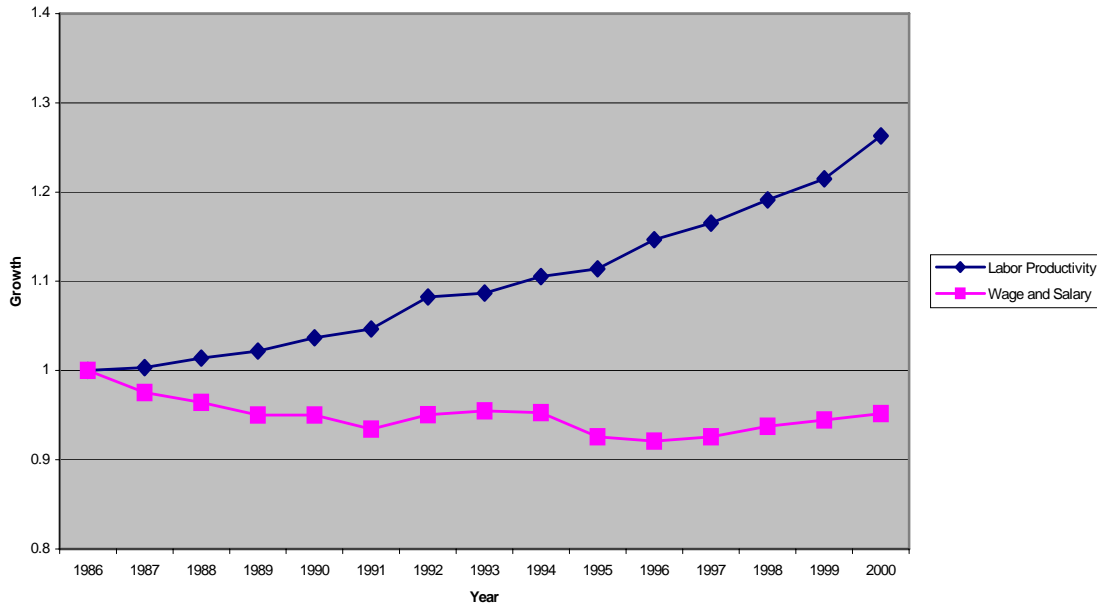


Figure 1. Labor Productivity and Compensation

The productivity measure depicted in this graph is the Labor Productivity reported by the Bureau of Labor Statistics (BLS), the most commonly cited productivity measure in the media. Wage and salary compensation figures are also compiled by BLS. Employer Costs for Employee Compensation (ECEC) is used in this graph. The Employment Cost Index (ECI) is more commonly used in the media. However, ECI is computed with a fixed weight for each occupation and, hence, the changes in employment are not reflected. ECEC is based on the same survey (National Compensation Survey) and the weight for each occupation is adjusted based on the recent employment statistics.

What happened to the 26.3 percent gains in productivity? In 2000 alone, these gains accounted for approximately \$2 trillion worth of the goods and services produced in the U.S.

Economist Paul Krugman at MIT presents an insightful analysis of this “missing” \$2 trillion. He focused on the dispersion between median and average income—an effort known as the “Krugman Calculation” (Krugman, 2000). He concludes that as much as 70% of productivity gains in the past decade have gone to those who earn the highest 1% income. Hence, the argument stands that recent productivity gains, which have been often credited to technological innovations—in particular, information technologies—have only increased the gap between rich and poor.

It is important to note here that our concern over economic inequality is not derived solely from our sense of fairness or justice. Such inequality is engendering unanticipated negative consequences in both society at large and in the workplace. For instance, Ichiro Kawachi of Harvard University and his colleagues (1997) studied the effects of deteriorating social capital, i.e. goodwill and trust in others in the U.S. Based on survey data from residents in 39 states, they conclude that income inequality decreases social capital which, in turn, leads to an increase in public health problems such as heart diseases and mortality rates. In the workplace, income inequality is also found to increase stress, lower employee morale, and decrease job performance (e.g., Cowherd and Levine, 1992). Numerous studies like these support the general

idea that inequality unravels the delicate social fabric that binds people together and brings about diverse negative consequences.

Despite these negative consequences, one can argue that it is almost inevitable for the rich to get richer. In the U.S., the richest five percent of the population owns over 70 percent of financial wealth—the “liquid” assets that could be invested in businesses—and the bottom 80 percent owns less than seven percent (Wolff, 1998). As shown in figure 2, the affluent may invest in business, make money, reinvest, and continue this cycle. The return for individual investors may vary widely. However, on the average, investment in business has been handsomely rewarded. Hence, barring a significant wealth tax, the gap between the rich and the poor would continue to increase (Wolff, 1998).

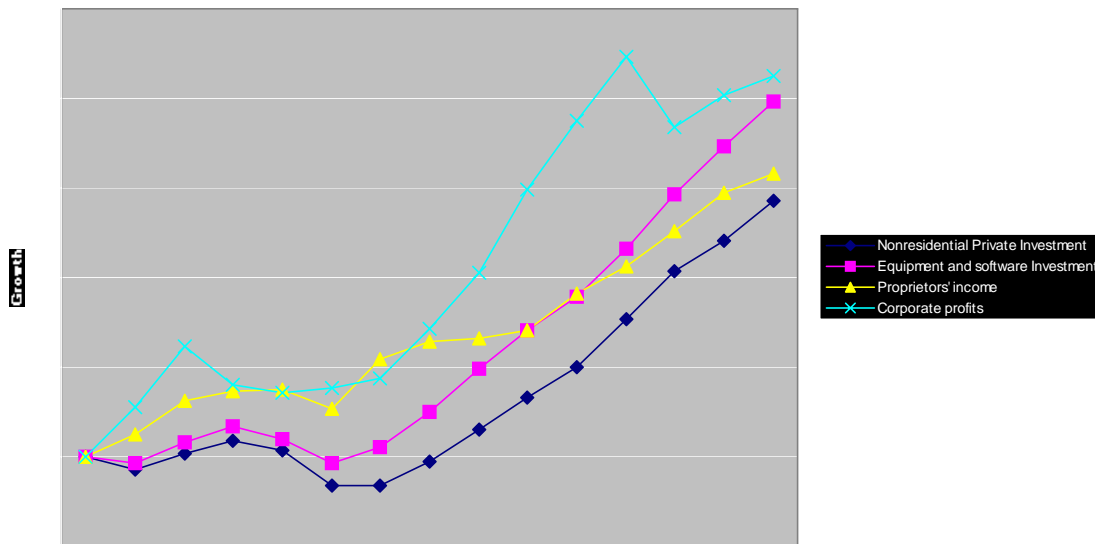


Figure 2. Growth of Investment and Earnings in the U.S.

All data used in this graph are prepared by the Bureau of Economic Analysis (BEA) as part of National Income and Product Accounts (NIPA). These numbers are adjusted for inflation using the Consumer Price Index.

It is important to note that inequality is not just an inevitable consequence of late capitalism; it comes with significant benefits. Capital investments invigorate competition in the marketplace thus creating healthy competitive markets which can bring about economic prosperity. For example, as Brynjolfsson and Hitt (1998) rightly point out, computers do more than help people to produce more of the same; conversely, computers allow people to improve the quality of products and services they provide. Those who took risks and invested in information technologies made such improvements possible. Thanks to such investments, consumers benefit from these quality improvements in products and services, even if workers do not directly benefit from productivity gains.

Nonetheless, having better products and services does not reduce income inequality. Indeed, to some extent, such improvements could worsen it. The affluent have more buying powers so they would benefit more from quality improvement.

In addition, two thirds of the Gross Domestic Product (GDP) constitute personal consumption expenditures—\$6.2 trillion out of \$9.2 trillion GDP in 2000. Increasing investments could not necessarily grow the economy, particularly, if such investment growth is made at the expense of reducing the disposable income of average working families (Krugman, 1994).

Hence, the question still remains: why haven't average workers benefited from the recent productivity gains? What could IS professionals say about all this? Next, I examine this question. I discuss why computers have been blamed for increasing economic disparities thus far and then describe how computers are actually narrowing this gap.

Amplifying Human Capabilities

The idea that computer automation can displace workers is not a new concept. It is reminiscent of the industrial revolution where factory workers were replaced with machines. However, in the modern economy, computers do more than simply automate workplaces. They amplify and expand human capabilities, enabling people to do more and higher quality work than before. Ironically, this amplification of human capabilities is, in part, engendering the unintended consequence of increasing economic disparities (see table 1).

IT Impact	How?	Intended Effects	Then, why is the gap increasing?
Gap Widening	-Amplify top performers -Convert expertise into intellectual properties	-Create better jobs -Make companies competitive -Provide consumers better products	-Retraining the workforce takes a long time -Retraining is expensive -Not everyone can be retrained
Gap Narrowing	-Support labor movement -"Level the playing field" -Promote pooling resources	-Unite workers for collective bargaining and political actions -Help the disadvantaged workers to become more productive	-The labor union movement has declined -Ideological and cultural environment is unfavorable to any collective action -Worker-led movements are not well-organized for competition

Table 1. IT Impact on Income Inequality

First, computers can amplify the capabilities of top performers. For example, Robert Frank and Philip Cook, in their acclaimed book, *The Winner-take-all Society*, describe how the advances in broadcasting and recording technologies have enabled the most talented pop singers and professional athletes to easily reach audiences of tens of millions of people. They suggest that this technology-enabled amplification of the top performer has drastically reduced the

demand for those who are even slightly less talented, while enabling a few top performers to make much more money than others.

One can find similar phenomena in many ordinary business firms. For example, data warehouses and online analytic processing (OLAP) applications help managers to collect, manipulate, and analyze a vast amount of data about their business. This synergetic fusion of technologies and human capabilities has enabled many top managers to expand their span of control effectively. Consequently, the demand for even the slightly less talented or less experienced managers has drastically diminished. At the same time, the salaries of the most competent executives and managers are skyrocketing.

Second, computers can also expand the capabilities of inexperienced or unskilled workers. Expertise and know-how can be captured, codified, and embedded in computer systems. These computer systems—one may refer to them as computerized intellectual properties—could improve the capabilities of inexperienced or unskilled workers by guiding them and prompting them to perform certain tasks. Hence, inexperienced and unskilled people would be able to do the tasks that require experience and expertise.

For example, customer relationship management (CRM) systems not only store information about customers, but also help salespeople generate new leads and recommend the appropriate products and services to customers. These applications are intended to improve human capabilities—by allowing an individual to become a more effective salesperson, for instance. With proper supervision and monitoring, less experienced and skilled salespeople could do as well as more experienced workers. Hence, the bargaining powers of the experienced workers would decline.

Amplifying the capabilities of workers at the top and the bottom tiers would not necessarily contribute to income inequality. Indeed, computer-enabled amplification is intended to bring about, in the long run, a win-win scenario for everyone. Companies would become competitive and profitable. Consumers would benefit from innovation. The displaced workers at the middle get retrained for a better job and become more productive than before.

However, in reality, three major problems must be resolved to realize this win-win scenario. First, economic restructuring that would entail educating or reeducating a large number of workers is considerably time-consuming. On the other hand, technological innovations are moving, relatively speaking, at a lightening speed. Second, education and training are, in many cases, very expensive. Often the most disadvantaged segment of a population is left to bear a large portion of these restructuring costs. Third, even in the most ideal educational settings, not everyone will become a top performer, regardless of their education and training. The important question therefore becomes, how many people at the middle would be able to move up in the income scale and how many would end up moving down.

This is why there is so much concern about the elite-bias of technology and its impact on the economic well-being of the middle and working classes (Krugman, 2000). Indeed, according to a recent study performed by the Bureau of Labor Statistics, the middle-range income jobs had the least employment and earnings growth in the 1990s (Ilg and Haugen, 2000).

Empowering the Disadvantaged

Corporate downsizing and mass-layoffs often cast an unflattering light on the use of computers in the workplace. However, in relatively less-publicized arenas, computers are also used explicitly to empower the disadvantaged.

First, the most “confrontational” approach to improving the income of ordinary workers would be to rely on the collective bargaining of labor unions, including possible work stoppage and strike. Even in this approach, computers help workers to improve their income. Many labor unions and their members use computers to boost morale and promote solidarity among workers.

For example, in February 2000, more than 20,000 engineers and technicians at Boeing participated in the largest white-collar worker strike in history. During the 40 days of this strike, union members strengthened their solidarity by using chat rooms, electronic mailing lists, and websites on the Internet, which allowed them to not only keep each other informed of certain happenings, but also to solidify their resolve by promoting solidarity.

Second, computers can be used to “level the playing field” for the disadvantaged. It is important to note here that workers at lower ranks in organizations are often disadvantaged not only because they may lack experience or talent, but also because they have limited access to information, resources, and opportunities for participation. For example, Lee Sproull at NYU and Sara Kiesler at Carnegie Mellon University investigated the effects of using computer-based network communication technologies such as the Internet. They concluded that these technologies enabled the disadvantaged workers to gain access to information and other resources to which they would not otherwise have had access.

Third, computers can also help the disadvantaged to pool their resources together. For example, sci.med.transcription is one of many Usenet Newsgroups (Internet-based public electronic bulletin boards) that facilitate collaboration among people in the same profession. In this electronic bulletin board, medical transcriptionists—people who transcribe medical information for MDs and hospitals—help each other by sharing their knowledge and experience. They discuss diverse topics such as the spellings of specific medical term, hardware and software for transcription, information about their employers and working conditions, and even how to balance work and private life. Through this on-line social interaction, they not only provide a supportive social context for one another, but through this collaboration, they help one another perform more effectively than they would have alone.

These examples demonstrate how computer systems are being used to empower the disadvantaged workers. However, this practice has not been as effective as IS professionals would have hoped due to a few major problems. First, the labor union movement has declined over time. For example, during the 1970s, 1 to 2.5 million workers participated in work stoppages every year. In the 1990s, this number decreased to as low as 73,000 workers in a year, while not exceeding 400,000 workers in any year. In addition, total union membership represents only 13.5% of the total work force.

Second, ideological and cultural barriers are also limiting the progress (Bellah et al. 1992; Giddens, 1991; Kraft and Bansler, 1994). For example, the cultural and economic institutions in the U.S. tend to celebrate and financially rewards individual achievement rather than a collective accomplishment. Indeed, this strong individualism, combined with the tenets of self-reliance, makes it difficult to organize and facilitate collaboration among workers.

Third, worker-led activities such as virtual communities of professionals and other professional associations are not well organized for competition in the marketplace. For example, even if these organizations and communities develop intellectual properties such as computer programs, manuals, and knowledge bases, in many cases they lack centralized authorities to negotiate and make deals with others on behalf of their membership.

For all these reasons, despite the efforts of many hardworking IS professionals, empowering the disadvantaged workers in this new economy through the use of computers has not been quite effective.

Conclusions

I began this paper by asking if computers are value-neutral. Indeed, one can argue that computers could be used, and in fact are being used, to both increase and decrease economic disparities among the work force. However, the socioeconomic contexts in which these computer systems are used are not as value-neutral as the technologies themselves. The vibrant effort in the private sector to amplify human capabilities is engendering the unintended consequence of widening the income gap. At the same time, ideological, cultural, and structural barriers make it difficult to empower the disadvantaged and narrow the disparities.

IS professionals should keep in mind that inequality creates many negative consequences including heightened social tensions and limited economic growth. We need to reinvigorate the entrepreneurial spirit and inspire people like those who jumpstarted the personal computer revolution in the 1980s and created such powerful corporations as Microsoft and Apple. More of us should direct our attention to devising ingenious ways in which computers can be used to narrow the economic disparities among people.

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