

# Vermont House of Representatives Artificial Intelligence Task Force

Testimony on the Impact of AI and Robots on Employment, Wages, and Inequality

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Good afternoon, Members of the Task Force. I am testifying in my capacity as Professor of Economics at the University of Vermont. My area of specialization is labor markets and the macroeconomy with a focus on trends in inequality.

I have prepared a PowerPoint presentation and here highlight the main points I would like to make regarding the impact of trends in the use of artificial intelligence (AI) and robots on labor markets, in particular wages and unemployment. I will share with you a synthesis of the research on this topic, as well as my assessment of it and thoughts on policies to mitigate negative effects of coming technological changes.

The central question that has been raised in the current debate about AI and robotization relates to whether these technological changes risk creating widespread unemployment, falling wages, and worsening income and wealth inequality. The context in which this debate takes place is the growth of inequality in the US and globally since the mid 1970s. The share of national income going to the very rich has increased dramatically over that the last 40 years to a level not seen since the year prior to the Great Depression. Further, the labor share of income—that is, the share of national income going to workers—has declined as wages have failed to keep up with productivity growth. These trends affected low-wage workers first—particularly those with a high school education or less and, more generally, blue collar workers. However, more recently, we also observe that even for the college educated, wages have stagnated since 2000. These trends have been accompanied by a decline in the labor force participation of working age adults, rising insecurity of work, and an increase in the share of workers with multiple jobs due to short hours. This brief summary underscores the anxiety with which new forms of TC are taking place, reflecting concerns about job shortages and rising inequality in the future.

In this context, I would like to make the following points:

- AI and robots are a newer form of technological change (TC) but TC has been a fact of life in capitalist economies since the 1800s. Until now, TC has been accompanied by the growth of productivity and employment, despite the fact that much TC has been labor-saving (i.e., labor-replacing). **The newer types of technological change differ from the past, however, in that they not only**

**substitute for routinized tasks and brawn; they also supplant cognitive tasks, with a greater potential for affecting middle- and high-income workers.**

- **Recent studies have emphasized the potential loss of entire occupations due to TC.** Frey and Osborne (2013), using data on 700 occupations, find that 47% of US employment is at risk of elimination in the next 10-20 years due to computerization. This is a theoretical paper that evaluates the probability occupations will be computerized based on the problems engineers need to solve in order for jobs to be automated. The characteristics of those problems are matched to different occupational characteristics. Jobs that are least susceptible to computerization are those that demand dexterity and manipulation, creative intelligence, and social intelligence. The authors find that the most vulnerable jobs are in office and administrative support, sales and related occupations, and production jobs. Those with the least exposure are jobs requiring social intelligence (education, healthcare, arts, media, management and business) and creative intelligence (STEM).
- **The outcome of these and other processes (such as globalization) has been job polarization. Middle-income jobs are in decline, especially those in manufacturing.** At the two extremes, there has been a growth of knowledge-intensive jobs as well as low-wage service jobs.
- **A key question regarding the impact of new forms of TC is whether the quantity of jobs is fixed or not.** One view is that TC will replace workers (or at least some tasks of workers), lowering overall labor demand and driving up unemployment. This prediction assumes that the number of jobs is fixed and thus any TC that replaces workers will lead to increased unemployment. This is a not necessarily the case since TC is likely to stimulate job growth in other occupations. Also, government **policy can influence the impact of TC on unemployment and wages.**
- More detailed analyses, including those by David Autor and others, emphasize that **every occupation includes a variety of tasks, not all of which are susceptible to elimination from AI and robots.** Predictions of entire occupations being eliminated are, as a result, overstated. A more likely scenario than the complete elimination of occupations is that the range of tasks performed will change with TC, as they have, for example, with bank tellers, administrative assistants and even radiologists. Moreover, evidence from history shows that the effects of TC on productivity growth in some occupations can spur increases in demand for labor in other occupations.
- **How the benefits of productivity growth are distributed will affect how TC affects workers and employment opportunities.** TC in theory should raise productivity (that is, increase output per worker). There are four possible ways to distribute the benefits of productivity growth from AI and robots.
  1. Firms could lower prices of the goods they sell. This would stimulate demand and employment.
  2. Firms could also share the gains of productivity growth with workers in the form of higher wages, again stimulating demand and job growth.
  3. Firms could reduce worker hours, without reducing wages.

4. Or firms could retain the benefits of productivity growth in the form of higher profits. This would widen inequality and would be likely to lower demand and employment.

The latter outcome has been the trend since the mid 1970s, contributing to the growth of inequality. The key factor in how the benefits of TC are distributed is the relative bargaining power of workers and firms as well as how competitive markets are. The greater the degree of concentration in industries, the more likely firms are to retain the benefits of TC in the form of higher profits rather than lowering prices or raising wages. More than 75% of US industries have experienced an increase in concentration levels over the last two decades. This factor, along with globalization, a declining value of the minimum wage, and the decline of unions have weakened the bargaining power of workers over the last 3 decades. These factors, more than TC, have contributed to the growth of inequality and downward pressure on worker wages.

- Government can attenuate these negative effects on wages and unemployment, including negative effects of TC, through a variety of actions:
  1. Implementation of robust **worker retraining** programs for displaced workers
  2. Increase in the **minimum wage** to boost worker bargaining power
  3. Improvement and **equalization educational outcomes** across groups (particularly by class and race)
  4. Support for lifetime learning,
  5. Use of tax policy to insure fair distribution of benefits of TC, such as by **taxing robots, raising the top marginal tax rates**, and adopting a **Universal Basic Income**.