HOUSE COMMITTEE ON THE BUDGET
Chairman John Yarmuth

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Machines, Artificial Intelligence, & the Workforce: Recovering & Readying Our Economy for the Future

Even before the COVID-19 pandemic slowed our economy and millions of Americans found themselves out of work through no fault of their own, many workers already had trouble finding stable, well-paying jobs or advancing their careers. Over the past few decades, the job market has changed drastically as technology transforms our economy with every breakthrough. As we look to the future, advanced technology and artificial intelligence (AI) present opportunities to improve our health and accelerate economic recovery – but at the risk of large-scale changes to the workforce and society that must be addressed. On September 10th, the House Budget Committee will hear testimony on AI technology and its potential benefits and pitfalls; effects on the economy, labor markets, and income inequality; and implications for federal policy and the budget.

AI is not close to replacing humans but is already changing the way we work and live — While AI may conjure images of sentient, self-aware machines, current AI technologies are essentially systems that learn from data to identify patterns, improve predictive capability, and guide decisions. This machine learning excels at complex but routine and narrowly defined tasks such as image processing, speech recognition, optimized navigation, and, when combined with robotics, improved mechanical automation. AI is a revolutionary, emerging technology that is critical to maintaining national security, leading in the industries of the future, and improving lives, livelihoods, and productivity. AI-enabled applications are already being developed in areas as diverse as health care, autonomous vehicles, supply chain management, personalized learning, agriculture, and legal analysis. Current AI technologies, however, also have significant limitations and raise ethical and societal concerns that require attention, including intrinsic or algorithmic bias and discrimination, privacy and data ownership, opaque decision-making, and job displacement.

AI is helping us fight the coronavirus but also accelerating job losses to automation — AI is strengthening efforts to understand, treat, and recover from the coronavirus, assisting in vaccine development, patient screening, elder care, and outbreak detection and surveillance. And it could help revitalize the economy by increasing productivity growth. To continue operations and keep workers safe in the midst of the pandemic, however, many companies are accelerating investments in AI-enabled automation, which could depress rehiring and raise the risks of a jobless recovery.

AI will increase economic productivity over time, accompanied by large workforce changes — Economists identify AI as a broadly transformative "general purpose technology," analogous to the steam engine, electrification, the internal combustion engine, and computing. It will likely revolutionize the economy in similar ways, with pervasive usefulness across sectors, continual improvements in capabilities, incremental adoption as businesses learn how to apply it effectively, and large, long-term productivity gains. In 2020, worldwide revenues for the AI market are expected to total more than $150 billion, but AI could generate up to $13 trillion in economic activity by 2030, equivalent to 1.2 percent additional GDP growth per year. Along the way, AI is expected to create short-term disruption and change in labor markets – not mass unemployment, but a dynamic and uncertain combination of job augmentation, job replacement, and job creation that we must plan and prepare for to ensure that no workers are left behind.

Widespread increases in unemployment are unlikely, but most jobs will require new skills and some occupations will be hit hard — While advancements in AI could create more opportunities for workers with advanced education or specialized skills, workers without these skills could see shrinking opportunities. Automation and technology development have likely already contributed to the loss of middle-income jobs and stagnating real income for most Americans since the mid-1990s. AI could exacerbate these problems. For most jobs it will only affect specific skills, with workers leaving some tasks to AI and automation and focusing their efforts on other more creative, strategic, and person-to-person tasks. But between 5 percent and 25 percent of jobs are at high risk for full replacement by AI, especially those centered on routine physical and data processing tasks that can be easily automated, such as in manufacturing, accounting, transportation, retailing, and food services – typically low- and middle-wage jobs.

A decline in middle- and low-skill jobs could increase income and racial inequality and reduce job security — In the absence of concerted efforts to develop human-complementary technologies that enhance rather than displace our work, AI-enabled automation could contribute to further wage inequality, shrinking middle-skill job opportunities, and declining labor force participation. In one study, each additional robot per thousand workers reduced wages by 0.42 percent. AI and automation may also widen racial and gender income gaps. Black and Latino Americans are disproportionally at risk of job and wage losses, and there are 40 percent more women than men who work in occupations at high risk for automation. Moreover, current AI technologies have raised concerns around intrinsic or algorithmic bias and discrimination, and more must be done to ensure AI technologies do not perpetuate or exacerbate discriminatory practices. For example, the use of AI in the hiring process itself – such as to screen resumes and applications – can reproduce human biases contained in the underlying datasets, usually to the detriment of people of color.

AI will broadly impact the federal budget, improving government services but requiring investments in job training and transition support — In tandem with IT modernization, AI can directly improve the efficiency of government operations and services, including better access to services for low-income and vulnerable populations. AI can also produce savings by improving the effectiveness and efficiency of government-supported programs, such as by reducing patient re-hospitalization rates and associated Medicare costs. Long-term gains in economic productivity could increase revenues, but decreases in wages or employment could reduce payroll and income tax revenues. Federal R&D investments will continue to be essential to U.S. leadership in AI technology.

Most importantly, the federal government may need to invest in policies that address AI-induced economic inequality and worker dislocation and transition needs. Reskilling and upskilling our workforce will require new approaches and federal support for training, education, apprenticeship, and credential partnerships – especially for mid-career workers who will still need to provide for themselves and their families as they learn new skills. Supporting workers through transitional periods will require strengthening income security programs and access to affordable health care, child care, and housing.

The world is changing rapidly, and as we seek to revitalize the economy in the aftermath of the pandemic, how can we best ensure that the implementation of AI and new technologies lead to inclusive economic growth and broad societal benefit? At this upcoming hearing, the Budget Committee will hear from expert witnesses and discuss the trajectory of AI and machine learning, the magnitude of the potential changes to our economy and workforce, and the federal policies that may be needed in response. Expert witnesses who will inform our discussion are:

- **Susan Athey, Ph.D.** – Economics of Technology Professor, Stanford Graduate School of Business; Associate Director, Stanford Institute for Human-Centered Artificial Intelligence
- **Daron Acemoglu, Ph.D.** – Institute Professor of Economics, Massachusetts Institute of Technology
- **Darrell West, Ph.D.** – Vice President and Director of Governance Studies, Brookings Institution
- **Jason Matheny, Ph.D.** – Founding Director, Center for Security and Emerging Technology, Georgetown University; Commissioner, National Security Commission on AI