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AI has the potential to change the way we work and live for the better

AI can help fight the coronavirus, but it is also accelerating job losses to automation

Widespread increases in unemployment are unlikely, but most jobs will require new skills, and a decline in middle-income jobs could exacerbate inequality

Federal action and investment are necessary to ensure AI's benefits are inclusive and widely shared – and to improve government-funded services

House Committee on the
BUDGET
Chairman John Yarmuth

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WITH SMART FEDERAL POLICIES AND INVESTMENTS, ARTIFICIAL INTELLIGENCE CAN TRANSFORM OUR ECONOMY AND WORKFORCE TO THE BENEFIT OF ALL

PREPARED BY HOUSE BUDGET COMMITTEE MAJORITY STAFF

The House Budget Committee held a hearing in September on "Machines, Artificial Intelligence, & the Workforce: Recovering & Readying Our Economy for the Future." The committee heard testimony from expert witnesses on artificial intelligence (AI) technology and its potential benefits and pitfalls; its likely trajectory and effects on the economy, labor markets, and income inequality; and its implications for federal policy and the budget.

Even before the COVID-19 pandemic slowed our economy and tens of 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. Now, as temporary layoffs become permanent and many companies turn to automation while the coronavirus keeps workers at home, workers could face steeper challenges even after the virus is contained.

We must make the smart choices and investments needed to get through the COVID-19 crisis. Our economic recovery is slowing, yet technological change has marched on. The job market will continue to shift as new technologies transform our economy with each new breakthrough, so we must lay the groundwork to address the resulting long-term challenges. "As we look to the future," Chairman John Yarmuth said, "AI has significant potential to
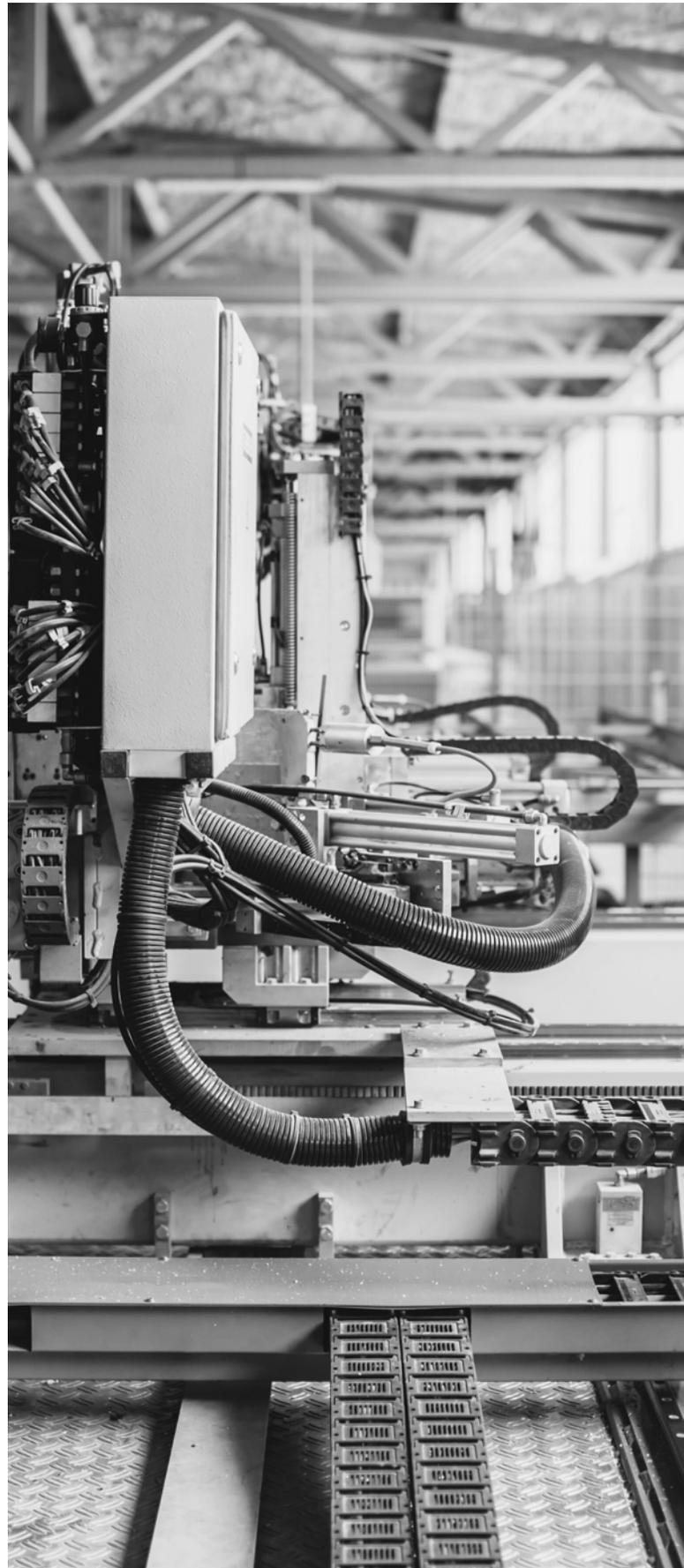
IN 2020, WORLDWIDE REVENUES FOR THE AI MARKET ARE EXPECTED TO TOTAL MORE THAN $150 BILLION, BUT AI COULD GENERATE UP TO $13 TRILLION IN ECONOMIC ACTIVITY BY 2030.

disrupt the world. It presents opportunities to improve lives, livelihoods, productivity, and equality. However, it also poses serious risks of large-scale economic changes."

AI HAS THE POTENTIAL TO CHANGE THE WAY WE WORK AND LIVE FOR THE BETTER

"ARTIFICIAL INTELLIGENCE IS ONE OF THE TRANSFORMATIVE TECHNOLOGIES OF OUR TIME AND LIKELY TO HAVE MAJOR RAMIFICATIONS FOR THE WORKFORCE AND THE ECONOMY."

Dr. Darrell West, Vice President and Director of Governance Studies at the Brookings Institution, testified that AI will likely revolutionize the economy. Economists identify AI as a broadly transformative "general purpose technology" with pervasive uses across industries, analogous to the steam engine, electrification, the internal combustion engine, and computing. By many measures, the United States

leads the world in AI, with recent advances being driven by improved algorithms, greater computing power and cloud computing, and increased data availability from digitization throughout the economy. AI is already finding increasing use in business functions like marketing and sales, supply chain management, and manufacturing, as well as national security applications. Nearly every class of industry is beginning to use AI, led by the high tech, automotive and assembly, and telecom industries, but with retail adoption growing fastest. 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.

"AI HAS ENORMOUS POSITIVE POTENTIAL FOR SOCIETY AND FOR THE EFFICIENCY AND FINANCES OF GOVERNMENT."

Dr. Susan Athey, Economics of Technology Professor at Stanford Graduate School of Business and Associate Director of the Stanford Institute for Human-Centered Artificial Intelligence, described how AI, if developed and deployed correctly, holds great promise for improving our health, accelerating economic recovery, advancing societal progress, and improving products, services, and standards of living for all. AI-enabled applications are already being developed in areas as diverse as health care (including medical imaging and drug development), autonomous vehicles, supply chain management, personalized learning, legal analysis, financial fraud detection, precision agriculture, energy, climate informatics, national security, and scientific discovery. As a whole, she said, AI can "make services cheaper to provide, higher quality, more tailored to the individual need, and substantially more accessible and convenient," especially for rural communities and low-income and vulnerable populations.

AI CAN HELP FIGHT THE CORONAVIRUS, BUT IT IS ALSO ACCELERATING JOB LOSSES TO AUTOMATION

"USING AI MACHINE LEARNING TO UNDERSTAND WHAT TREATMENTS WORK BEST WAS ACTUALLY VERY LIMITED IN THE UNITED STATES."

Dr. Athey testified that AI algorithms are well suited for applying medical data about patients – including COVID-19 patients – to predict the course of hospitalization and understand what treatments work best. Unfortunately, the Trump Administration's lack of coordination at the federal level hindered the use of AI to analyze and respond quickly to the pandemic; failing to focus research and development (R&D), clinical trials, and data gathering across the medical system. Looking forward, AI can still help advance efforts to understand, treat, and recover from the pandemic by assisting in vaccine and treatment development, patient screening, contact tracing, and outbreak detection. And by helping us defeat the virus more effectively and efficiently, AI technologies could help speed up our economic recovery.

"THE COVID-19 PANDEMIC WILL ALSO CONTRIBUTE TO THIS PREDICAMENT [OF EXCESSIVE AUTOMATION] AS THERE ARE NOW MORE REASONS FOR EMPLOYERS TO LOOK FOR WAYS OF SUBSTITUTING MACHINES FOR WORKERS."

Dr. Daron Acemoglu, Institute Professor of Economics at the Massachusetts Institute of Technology, testified that the pandemic is increasing private-sector adoption of AI-enabled automation that displaces jobs. Approximately 75 percent of large companies in one survey said that, in response to the pandemic,

AUTOMATABLE JOB LOSSES WERE 5.1 PERCENTAGE POINTS HIGHER FOR MINORITY WORKERS THAN FOR NON-HISPANIC WHITES.

they are accelerating automation or considering plans to do so. Without thoughtful implementation of the technology and forethought for the needs and well-being of workers, this could have a potentially devastating impact on our workforce. While automation can reduce the risk of coronavirus transmission while businesses continue to operate, it also raises the risks of permanent job losses, a jobless recovery, and stagnant or reduced earnings for the typical worker. Indeed, since the pandemic started, 8.7 percent of easily automatable jobs have been lost through August 2020, compared to 4.4 percent of less automatable jobs. **And the racial inequity is pronounced: automatable job losses were 5.1 percentage points higher for minority workers than for non-Hispanic whites.**

WIDESPREAD INCREASES IN UNEMPLOYMENT ARE UNLIKELY, BUT MOST JOBS WILL REQUIRE NEW SKILLS, AND A DECLINE IN MIDDLE-INCOME JOBS COULD EXACERBATE INEQUALITY

"THE U.S. ECONOMY TODAY AND U.S. WORKERS ARE SUFFERING FROM WHAT I VIEW AS EXCESSIVE AUTOMATION."

"The extent of automation is excessive in that it is not leading to sufficient productivity growth, creating new tasks for humans, or increasing wages," Dr. Acemoglu said. In recent years, technology companies have focused on developing new automation that is just good enough to replace human labor, but not yet good enough to significantly enhance productivity – or generate human employment opportunities in other areas.

This trend has been driven by: the dominance of a small set of large technology companies, which account for more than two-thirds of global AI investments; dwindling federal support for R&D that could advance

a broader set of technologies complementary to human labor; and a tax code that has increasingly treated capital more favorably than labor. Over the last 40 years, the effective labor tax rate has exceeded 25 percent, but the effective taxes on equipment and software is now a mere 5 percent, down from 10 percent prior to the 2017 Republican tax cuts. Having a tax code that favors equipment and software over human workers encourages companies to automate – even if it doesn't equate to greater efficiency – at the expense of American workers.

"ONE RESULT OF THIS [EXCESSIVE AUTOMATION] HAS BEEN THE DISAPPEARANCE OF GOOD JOBS, ESPECIALLY FOR WORKERS WITHOUT POST-GRADUATE DEGREES OR VERY SPECIALIZED SKILLS."

Dr. Acemoglu testified that trends in automation, especially since the 1990s, have led to a declining share of labor in national income, the loss of middle-income jobs, stagnating real wages for most Americans, and a huge increase in inequality. Private-sector spending on workers has been stagnant over the last 20 years, and many workers have found it difficult to obtain jobs with decent wages, prospects for promotion, and job security. Dr. Acemoglu estimates that each additional industrial robot in the United States displaces 3.3 workers on average – and the next phase of automation relying on AI could be even more disruptive.

"AS AUTOMATION CHANGES THE ORGANIZATION OF WORK, SOME JOBS ARE LIKELY TO BE ELIMINATED, AND NEWLY CREATED JOBS MAY REQUIRE DIFFERENT SKILLS."

According to Dr. Athey, widespread increases in unemployment are unlikely, but workers will need to transition and reskill more frequently. For most jobs, AI will replace only specific tasks, with workers focusing their skills on other more creative, strategic, and interpersonal 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. These job losses may or may not be counterbalanced by the creation of new jobs, which are likely to have higher skill requirements.

"THERE ARE INCOME DISPARITIES. THERE ARE RACIAL DISPARITIES. THIS IS A HUGE PROBLEM."

As Dr. West and other witnesses discussed, the negative wage and employment effects of automation are most severe for low- and middle-income occupations and at low education levels. Forty percent more women than men work in occupations at high risk for automation, and

FORTY PERCENT MORE WOMEN THAN MEN WORK IN OCCUPATIONS AT HIGH RISK FOR AUTOMATION.

because Black and Latino Americans are over-represented in occupations at high risk for automation, they are disproportionally at risk of job and wage losses – exacerbating the large and persistent racial wealth gap that already exists.

"AS AI IS ADOPTED THROUGH GOVERNMENT AND THE ECONOMY, IT WILL BE IMPORTANT FOR GOVERNMENTS TO KEEP ACLOSE EYE ON THE MYRIAD CHALLENGES RAISED BY AI."— As AI applications emerge in employment, housing, health care, financial services, and criminal justice, Dr. Athey testified that advancing societal interests equitably will require accountability and intentional focus on finding solutions to ethical AI issues like bias, privacy, and reliability. For example, using AI tools in the hiring process to screen resumes and applications can reproduce and even exacerbate human biases and discrimination contained in the underlying datasets, often to the detriment of people of color. Productivity monitoring of employees can help improve worker safety and regulatory compliance but raise both privacy and bias concerns. AI systems are typically "black boxes" that can produce flawed results if used in new or changing environments for reasons that can be difficult to interpret. Yet, only 13 percent of large companies surveyed are taking steps to mitigate the risks associated with equity and fairness.

FEDERAL ACTION AND INVESTMENT ARE NECESSARY TO ENSURE AI'S BENEFITS ARE INCLUSIVE AND WIDELY SHARED – AND TO IMPROVE GOVERNMENT-FUNDED SERVICES

"THE UNITED STATES IS IN A STRONG POSITION GLOBALLY. BY MOST MEASURES, WE LEAD THE WORLD IN AI…. WE SHOULD DOUBLE DOWN ON THESE STRENGTHS."

Dr. Jason Matheny, Founding Director of Georgetown University's Center for

Security and Emerging Technology and Commissioner on the National Security Commission on AI, testified that while the United States is currently among global leaders in the field, additional action and investment are needed to maintain U.S. competitiveness. Due to years of decreased federal investment in R&D, the United States has fallen from 4th to 10th since 1995 in a global ranking of R&D expenditures. We can't make the same mistake with AI. Dr. Matheny suggested U.S. innovation and leadership in AI should be strengthened by expanding: (1) AI research, testing, and evaluation infrastructure; (2) immigration pathways to permanent residency for scientists, engineers, and entrepreneurs; and (3) research and protections for the leading-edge microelectronics technologies that are used to power AI applications. Dr. Acemoglu and Dr. Athey also emphasized the importance of federally supported R&D for developing AI that better augments human performance – from AI systems that interact better with humans to AI applications that improve human capabilities through better education, health care, etc.

"AI IS WELL POSITIONED TO CONTRIBUTE TO PROVIDING SCALABLE AND EFFECTIVE… ACCESS TO GOVERNMENT-PROVIDED AND GOVERNMENT-FUNDED SERVICES."

Dr. Athey discussed the potential for

AI – enabled by cloud computing and IT modernization – to improve government operations and services and produce savings. The National Academy of Public Administration identified making government AI-ready as one of 12 grand challenges over the next decade. For example, AI can reduce patient re-hospitalization rates and associated Medicare costs. Automation of routine federal government employee tasks could save between $3.3 billion and $41.1 billion annually, freeing up resources and workers' time in order to address higher-value activities.

"WE WILL NEED TO FIGURE OUT WAYS TO INVEST IN AND DELIVER EFFECTIVE WORKFORCE TRAINING, JOB UPSKILLING, AND CONTINUING EDUCATION."

Dr. West and the other witnesses emphasized the importance of education and training – including in science, technology, engineering, and math – to help workers adapt to changes and compete globally. Strengthened federal support for community colleges, vocational education, and apprenticeship programs is vital, especially for workers seeking practical, low-cost ways to develop skills while still providing for themselves and their families. AI technology itself can help create more adaptable classrooms, blend online training with in-person practice, and personalize learning.

"TRANSITIONS WILL BE THE NEW NORMAL FOR WORKERS. IT WILL BE IMPORTANT FOR GOVERNMENTS TO ADDRESS THE CHALLENGES FACED BY WORKERS."

Dr. Athey testified that we need to improve how we assist displaced workers transitioning to new jobs. Since most benefits are tied to full-time employment, Dr. West described the importance of benefit portability and flexibility, such as reforms that allow workers to retain health care and retirement benefits between jobs. More generally, supporting workers through more frequent transitional periods will require strengthening worker protections, income security programs, and access to affordable health care, child care, and housing.

"ONE THING THAT APPEARS CLEAR IS WE ARE GOING TO NEED GREATER INVESTMENT BY BOTH THE PRIVATE AND THE PUBLIC SECTORS."

Dr. West emphasized that the federal government will need to take a leading role in funding and implementing new policies to ensure the benefits of AI reach all Americans while supporting displaced workers. R&D, digital infrastructure, education and training, and income and social support programs all call for increased investment. At the same time, the economic shift toward digital sectors and increased automation will reduce tax revenues

because the U.S. tax system taxes capital significantly less than labor. Dr. Acemoglu recommended correcting this differential taxation by closing business tax loopholes, broadening the capital tax base, and ensuring a greater share of capital income is taxed. Moving to a more optimal tax balance could increase employment by as much as 4 percent.

CONCLUSION

The world is changing rapidly. As we seek to recover and revitalize the economy in the aftermath of the pandemic, the federal government must make smart investments to harness AI's potential. This will help create inclusive economic and job growth, generate broad societal benefit, and improve standards of living for all Americans. As Dr. West concluded, "It is crucial to think proactively as tech changes unfold. The longer we wait, the more painful the transition will be. Now is the time to start having the discussions required to make meaningful changes."