
From the Editor



Information technologies, robots and other machines that replace human labor have been intensively introduced in developed and developing countries for several decades, but unemployment rate in most countries is low and some are facing labor shortages. However, the replacement of human labor with machines, similar to the past, raises fears of long-term mass unemployment. Labor productivity in most developed countries has been growing slowly for almost two decades, despite intensive digitalization and other technological innovations, resulting in stagnant living standards. In addition, workers in developed countries have been facing labor market segmentation for several decades, with a relatively small percentage of well-paid workers whose wages are rising year by year, while the wages of most workers have stagnated for decades.

The link between innovation and jobs is relatively complex. Innovations, such as the introduction of new machines in existing activities like agriculture, construction, traditional industry, etc., reduce employment. Although the decline in employment is partially offset by job creation in industries that produce raw materials, parts and energy for new machines and their maintenance, the net effect of this type of innovation on employment is negative. Other innovations create new activities, as was the case in aviation industry, chemical industry, information technology, etc., which create new jobs that did not exist before, which allows employment growth. Both types of innovations lead to an increase in productivity, and thus to a real income of workers on the one hand, but also to a fall in the relative prices of products on the other hand. The growth of real incomes and decline in relative product prices enable a decreasing percentage of incomes to be spent on meeting existential needs, and an increasing part on satisfying non-existential needs. The growth in demand for non-existent products, such as catering, tourism, culture, entertainment, aesthetic and other services, which in the past were available to only a small percentage of the population, has enabled the creation of new jobs.

Technical innovations did not come by themselves, but were encouraged by the spread of the ideas of the enlightenment and rationalism, and then by a series of institutional innovations, which created the preconditions for the emergence and spread of innovations. Institutional

changes such as the establishment of freedom of opinion, including freedom of scientific research, protection of property rights, including the time-limited protection of patents and licenses, fostering competition, equality of market participants, etc., have played a key role in creating and disseminating innovation. Availability of education to broad masses of the population enabled better use of human capabilities to create innovations. The involvement of the state in the regulation and financing of education and fundamental scientific research has essentially contributed to the acceleration of technical progress.

The fear that the introduction of machines in production will result in an increase in unemployment has been present since the beginning of the industrial revolution. Although the replacement of human labor by machinery has in some countries caused unemployment to rise in shorter periods, technical innovations have contributed to a total increase of world population by about 12 times since 1700, while productivity growth has enabled the real value of income to increase, and thus citizen standards, by about 14 times. Technical progress since the beginning of the industrial revolution has enabled a simultaneous multiple increase in standards, but also in the number of jobs and number of inhabitants. A significant increase in productivity, due to a series of frequent innovations, pulled humanity out of the Malthusian trap as a result of which innovations in the pre-industrial era led to a temporary increase in standards, which allowed population growth, and then population growth lowered the standard to the previous level. The result of the Malthusian trap was that from the beginning of the new era until 1700, the number of inhabitants increased by 2.7 times, while their standard increased by only 30% in the same period.

Of course, the fact that technical innovations have created significantly more jobs in the past than they have extinguished does not necessarily mean that they will continue to do so in the future. Some scientists believe that in the next few decades, artificial intelligence, robots, etc. will replace humans in doing most existing jobs, and that this could lead to high long-term unemployment and increased economic inequality. However, most scientists believe that such a possibility is unlikely in the next 100 or 200 years, i.e. that artificial intelligen-

ce and controlled machines are more likely expected to take over routine tasks, while existing and new non-routine jobs will continue to use human labor.

Along with automation, by which machines take over some jobs from people, it is expected that technical, institutional, market and other innovations will create new jobs in the future. When it comes to technical innovations, it is expected that they will continuously create new non-routine jobs, which will take a relatively long time to be taken over by machines. The creation of new jobs will be achieved by the growth of demand for existing non-existent services, difficult to automate, which will occur due to rising incomes of citizens, falling prices of existing products and increasing leisure time. Additional jobs can be created or at least the existing ones can be preserved by shortening the working week, as has happened during the last 150 years, when the working week was shortened from 60-70 to 35-40 hours. The condition for the standard of living to be maintained or increased despite the shortening of the working week is to continue to increase productivity in the future.

Keeping unemployment low in the future is likely to be facilitated by demographic trends. In a large number of highly and middle-developed countries, the total number of indigenous people, including the working age population, has been declining over the last few decades. The problem of declining labor supply in developed countries is temporarily delayed by the immigration of labor from countries that have a positive natural increase as well as from other less developed countries. Demographic projections indicate that the decline in natural growth will spread to an increasing number of countries, as a result of which the maximum number of people in the world is expected to be reached in a few decades, after which it will begin to decline. The consequence of such demographic changes on the world level will be that the full employment is achieved with a declining number of jobs, which is a significantly different situation from the one that has

Growth in labor productivity is a necessary condition for a long-term sustainable growth of citizens' standards, but over the last two decades, along with the strong development of information technology, labor productivity in most developed countries has stagnated or had a modest growth. Possible reasons for the slowdown in productivity growth are that the advanced information technologies are not yet widely used, but also the absence of significant progress in technologies that are complementary to them, such as robotics. There are opinions that progress in information technologies is not enough for increase in overall productivity, i.e. that progress is needed in a number of other areas to increase overall productivity.

Slow technological advances in other areas are often explained by the fact that in most areas fundamental discoveries in recent decades are rare because public investment in fundamental research is low and the private sector does not have enough motivation to invest in expensive research whose commercial application is very uncertain. Increasing government investment in basic scientific research, as well as increasing government subsidies for basic research in the private sector, would contribute to accelerating technical progress and thus productivity growth.

In a number of developed countries over the past three to four decades, the labor market has been segmented into a small percentage of highly skilled and well-paid workers and a large number of low-paid workers. Some researchers cite unbalanced technical progress as a reason for labor market segmentation, which results in the automation of a large number of medium-paid routine jobs, but which does not create a sufficient number of new non-routine jobs. According to an alternative view, the main cause of labor market segmentation in developed countries is the globalization of the capital market, which leads to the relocation of a large number of medium-paid jobs to poorer countries where labor costs are lower. As evidence in support of this explanation, it is stated that segmentation is strongest in countries that have undergone pronounced deindustrialization in previous decades, such as the United States and the United Kingdom. Although the globalization of capital markets has increased inequality in both developed and developing countries, it has had an important positive effect in developing countries, namely the growth of average income and reduction of poverty. According to the third point of view, the main cause of the growth of inequality is in the tax policy, i.e. in the less favorable tax treatment of labor income, in relation to the tax treatment of capital income, as well as in reducing progressiveness in taxation of personal income.

Previous explanations for the growth of income inequality are not mutually exclusive, as it is possible that technical progress has reduced the demand for medium-paid routine jobs without creating enough new non-routine jobs, while capital market liberalization has affected the relocation of medium-paid jobs from developed countries. These two factors probably had a key impact on the growth of inequality in labor income, as inequality in the distribution of market income increased more than inequality in the distribution of disposable income that is affected by tax policy.