Society of Business Economists Annual Dinner

The times they are a-changin'…

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London, 11 November 2015

I first wish to thank the Society of Business Economists for inviting me here tonight.

My address draws on the first chapter of a book I have recently published in Italy, whose title is borrowed from a famous song that Bob Dylan sang over fifty years ago. (An English version is now available online[1], which formed the basis for a lecture I delivered earlier today at the LSE Institute of Global Affairs.)

Change is the central theme of this address: times have truly changed in the past half-century, particularly as a result of the rapid and constant transformation spurred on by technological progress. This transformation is still very much with us and perhaps more than ever today, as interactions between longer-term trends and short-term developments are becomingly increasingly important, and current economic developments cannot be analysed merely from a cyclical point of view.

Before discussing change and its short- and longer-term challenges, I wish to say a few words about the state of the business cycle. In the main advanced countries economic activity continues to expand, but the slowdown in the Chinese economy has adversely affected commodity prices and activity in the emerging countries. So far the global slowdown has had a limited effect on the euro area, as the economy continues to expand, but looking ahead it poses a downside risk for growth and inflation. The expansive measures adopted by the Governing Council of the ECB have provided support to growth and to the recovery of credit. The Council stands ready to use every available instrument to combat the downside risks and ensure the return of inflation to values consistent with the definition of price stability. High unemployment is a most painful legacy of the crisis in advanced countries. Even in the US, where employment gains have been substantial, the halving of unemployment to 5 percent from its recession peak is clouded by stagnant labor productivity, weak wage growth and a labour force participation rate that is hovering at around a 40-year low.

In fact, it seems to me that, especially today, short-run developments cannot be assessed separately from the more profound changes that we observe in our economies and societies. I would like to begin my remarks by recalling some of these changes that best epitomise how profoundly the world has changed, with an acceleration triggered by the end of the Cold War and the advent of globalisation. I will then briefly touch upon on the debate between, on the one hand, the secular stagnation hypothesis, which has been revived in the aftermath of the Great Recession and, on the other hand, the optimistic view centred on what has been called the “second machine age” ushered in by the digital revolution. I will subsequently focus on the impact that the digital revolution is exerting on the characteristics and availability of jobs demand, with potential macroeconomic

[1] http://www.bancaditalia.it/pubblicazioni/interventi-governatore/integov2015/Visco_11112015_LSE.pdf

consequences. I will conclude by pointing to some possible policy responses to the challenges posed by the current wave of technological progress and the risk of sustained slow growth.

Fifty years of great changes

The history of humankind is in itself a story of change: demographic, technological, religious, social, political, economic. Often, economists' models depict economic growth as a balanced, linear process, but in reality it is far from regular, a fact that has not escaped economists themselves. Yet over the past two centuries the market, demographics and technical progress have produced wealth, work, and better living standards for steadily increasing masses of people. This has come about through a series of social, individual and collective travails that have made the process non-linear, yet not random. This is very much the same today: the transformations of the past half-century may not have been either linear or painless, but the gain in well-being for most of the world population has been extraordinary.

The driving force, together with the opening up of markets, has been technological change. The most evocative example is perhaps the exponential growth in the computing power of microchips (predicted fifty years ago by the legendary "law" of Gordon Moore): today's typical smartphone has 3 million times the computing power of the first minicomputer marketed successfully in 1965, at one 225th the cost.

Some of you may recall that, back in the 1970s, producing forecasts and economic policy analysis based on simulations from an econometric model – which at that time meant solving a hundred equations or so – could take several hours of data-processing time. Already by the early 1980s, when we built the Bank of Italy's quarterly model of the Italian economy, the time needed for each simulation had fallen to just a few minutes. Today we can carry out complex stochastic simulations in just a matter of seconds.

Change seems to have gathered momentum following the end of the Cold War. The introduction of the Internet in 1991 changed our way of communicating forever, and the mobile telephone has made communication incredibly widespread and incomparably cheaper. The first commercial communications satellite was put into orbit by the United States in 1965; we now have about 400 active satellites worldwide. Whereas in 1980 there were 5 mobile phone subscriptions per million population, there are now 90 for every 100 people. Technological advance has also brought about much more efficient energy use, saving more than 25 per cent on energy for the same volume of goods and services produced, in comparison with 1991. And more progress still has to be achieved,

given our current struggle with climate change and the fact that it is impossible for us to ignore the environmental balance of our planet.

The effects of combining technological innovation with globalisation, itself facilitated by the technological revolution, have been astonishing as well. The contribution to world growth coming from today's emerging economies, which had been excluded from the economic integration of the twentieth century, has gone from 30 per cent in 1965-74 to 70 per cent over the past ten years. The global financial transactions and financial assets, in dollar value, are nearly 300 times larger than in 1970 (while US consumer prices have risen just sixfold).

The world economy is six times larger now than fifty years ago and per capita output more than twice as great, even though the world population has also more than doubled. Although little less than a billion people still live in extreme poverty (on incomes of less than $1.90 a day, the new benchmark adopted by the World Bank), the objective of halving their number was attained in 2010, five years earlier than was called for by the UN Millennium Development Goals of 2000. And apart from the billion who have been lifted out of extreme poverty, we should count another 2 billion added to the world population over the last twenty-five years, mostly in the emerging and developing countries, who have not entered this state. The gap in life expectancy between these countries and the Western world (where it has nevertheless continued to lengthen) has narrowed dramatically.

These are clearly extraordinary changes, but they have not occurred in a straightforward, linear fashion. The world economy has gone through a recession every decade since the 1960s. The increase in welfare has not been evenly distributed among the world population.

While the international inequality in income distribution has diminished, the fact remains that between 1990 and 2010 domestic inequality became more severe in two thirds of the countries for which data is available. In the United States, while per capita output expanded by some 40 per cent between 1990 and 2007, real median household income gained less than 10 per cent. After the sharp drop in output and employment due to the financial crisis, production has now regained and surpassed its 2007 level, but median income has fallen back to the levels of over twenty years ago. It is often remarked – and much more so following the success of Thomas Picketty's bestseller, based on the analytical works conducted with Tony Atkinson and Emmanuel Saez – that the wealthiest 1 per cent of the population now accounts for about 20 per cent of US national income, compared with 8 per cent fifty years ago. And the increase in the incomes of the super-rich (the top 0.1 per cent) has been sharper still, with an accentuation of the concentration of wealth.

“Secular stagnation” and the “second machine age”

The renewed debate on the risk of hysteresis (i.e., the extent to which the short-term cycle influences the longer-term dynamics of the economy) is one of the legacies of the global financial crisis and the “Great Recession”.

The starting point is the fact that even in the United States and the United Kingdom, the countries that left the acute phase of the crisis behind them most quickly, the growth rate remains lower than in the pre-crisis years. In the euro area as a whole output is still below its pre-crisis level, which it is projected to regain by the end of this year.

Against this background, Larry Summers has revived the “secular stagnation” hypothesis originally advanced by Alvin Hansen in the 1930s and forcefully rebutted in practice by the protracted economic expansion that followed World War II. The new secular stagnation hypothesis refers to the increasing propensity to save (in order to pay down excessive debt) and to the reduction in investment and in aggregate demand in recent years. The decline in the relative price of capital goods induced by technological innovation, though it has resulted in a substitution of capital for labour, may also have played a role in lowering investment expenditure in nominal terms. As Summers notes, unlike new business ventures in the traditional sectors, those in the digital economy may involve a reduced amount of money to start up, thus resulting in a possible reduction in aggregate capital expenditure.

In circumstances like these, maintaining the balance between saving and investment – which is essential to full employment – could require a level of negative real interest rates (that is, net of inflation), that monetary policy may not be able to deliver. Nominal interest rates, in fact, are now close to zero (the “zero lower bound”) and the increase in prices is minimal. The consequence is stagnant economic activity and the underutilisation of resources. At the same time the legacy of the financial crisis – namely the need to reduce financial leverage and decrease public and private debt – may not be temporary. Against the backdrop of low inflation and reduced potential growth, the global ratio of debt to output continues to rise.

Apart from the short-run Keynesian effects linked to rigidity and constraints on the adjustment of relative prices, we should consider the possible medium-term repercussions that a protracted state of high unemployment and disinvestment could have on the economy’s capacity for growth. Moreover, we are certainly aware – even if the risk is still remote – that holding interest rates very low for very long periods may result in fuelling excessive financial risk-taking, imprudent lending practices and, ultimately, dangers for financial stability.

A second version of the stagnationist hypothesis, put forward notably by Bob Gordon, does not consider demand and investment but instead focuses on the supply side, and in particular on the rate of growth of productivity, i.e. the economy's potential output for a given amount of available human and material resources employed in the production process. The key argument here is that the great inventions that have resulted in massive productivity increases have for the most part already been introduced, so that a return to more moderate growth rates is inevitable. This thesis is at once daring and perhaps over-simplified, even though it is supported by some careful analysis of the data and historical trends.

Those who oppose these rather gloomy views base their arguments on some distinctive features of the current wave of technological progress, notably its suitability for widespread use in practically every area of economic and social life. The introduction of personal computers and the Internet may have been gradual, not significantly different, in terms of the time taken, from electrification. However, as Brynjolfsson and McAfee have observed, it is perfectly possible that the digital revolution is still far from having worked all its effects on productivity.

Even if it is apparently gradual, the nature of technical progress in the digital age, they say, is exponential, as in the ancient (Persian) legend in which grains of rice placed on the chessboard have to be doubled from one square to the next: the volume is almost negligible at first but in the second half of the board it becomes overwhelming. Not to mention other pioneering areas of research like robotics, genomics and artificial intelligence, which may have incredible applications that were once unimaginable (save for people like Jules Verne or Isaac Asimov), with an extraordinary impact on productivity and in the ultimate analysis on our well-being. A "second machine age", indeed.

Technology and labour demand

There is, however, an issue that forms a critical part of discussions on the effects of the digital revolution: its impact on labour demand and the skills required to maintain or get an occupation in the second machine age.

Starting with the first industrial revolution, technical progress has regularly displayed the ability to engender not only widespread rises in per capita income and living standards but also expanded and more rewarding job opportunities. The digital revolution of our own day confirms the far-reaching benefits that the entire society obtains from technical progress.

But digital technologies have a distinctive feature: the greater speed with which they tend to replace labour, even in fields in which human intervention has always appeared to be decisive. This suggests the revival of the concept of "technological unemployment" proposed by Keynes in his 1930 essay on the prospects for future generations and thus indicated as one of the forces behind the decline in job opportunities and the stagnation of wages and incomes observed in a number of industries and countries.

Fifty years ago, when Dylan's emblematic song first appeared in the US, a small book was published in the UK that dealt with production efficiency, income distribution and corporate ownership. It was written by James Meade, an economist and Keynes' disciple well-known for his work in the field of international trade, which would eventually earn him the Nobel Prize in 1977. More than pose the social and economic problem of what to do when automation means that "we need to work only an hour or two a day to obtain the total output of real goods and services needed to satisfy our wants," Meade asked "What shall we do when output per man-hour of work is extremely high but practically the whole of the output goes to a few property owners, while the mass of the workers are relatively (or even absolutely) worse off than before?".

What can we say on this point today? To my mind, we must consider the matter on three levels. First, the crucial question is to determine whether the net loss of jobs due to technological innovation is temporary or permanent. This is not a new question. As I recalled above, history shows that although automation has certainly brought about the substitution of capital for labour in given economic sectors, for the economy as a whole technical progress has been a source of new and better work opportunities. It is legitimate to ask whether things may not be different this time around. So far in the United States and elsewhere the new technology has brought the polarisation of occupations, with employment gains concentrated in low-paid service jobs and high-paid jobs requiring considerable educational attainment, to the expense of mid-skilled jobs. A few recent, widely-cited studies emphasise that about 50 per cent of existing jobs in the United States and Europe risk being automated out of existence, possibly within a decade or two.

While such estimates must be handled with great caution, given the patent difficulty of assigning risk percentages to jobs whose content may change radically thanks to the new technology itself, it is a fact that the new wave of technological innovation in the fields mentioned earlier (robotics, genomics, artificial intelligence) could nevertheless have a substantial impact on the labour demand relative not only to routine but also non-routine tasks that cannot, apparently, be standardised, at both low and high levels of skill.

The second question is the relationship between technological progress and the increase in income inequality so forcefully anticipated by Meade. The sensation made by Thomas Piketty's *Capital in the Twenty-First Century* readily demonstrates how topical this question is. Here the point seems to me not just to decry the emergence of the top 0.1 per cent of the population, who would appear to be the great beneficiaries of the economic transformation of recent decades. Rather, it is to determine the extent to which current and prospective trends in technology can alter, for the purposes of economic growth, today's relationship between capital and labour, how great the risk is that substantial portions of the work force will be driven out of the production process, regardless of their level of education and competence.

The third consideration, given the re-emergence of issues like technological unemployment, income concentration and the domination of capital (machines) over labour, involves the possible repercussions on aggregate demand. Those who argue that the fruits of technical progress and the related increase in productivity will go mainly to the relatively few owners of the new technology firms are certainly raising the question of distributive fairness. At the same time, however, if they are to be produced at all, these fruits need a sufficiently high level of effective demand.

That is, there is also a broader, macroeconomic question involving the distribution of income: in order for the goods and services that will make up tomorrow's output to be sold, income, jobs and property will have to be widely distributed throughout the population. In other words, for the enormous increases possible on the supply side to be realized, there will have to be consumers in a position to create effective demand for the new goods and services.

Policy responses

The responses to the long-run slowdown in economic growth that many analysts fear cannot but be multiple, and very likely different from country to country. Benjamin Friedman, for instance, contends that at least for the United States, more and better education for an increasingly large portion of the labour force is a partial solution at best, insufficient to buffer the impact of technology on jobs and earnings. On this issue, however, Ned Phelps observes that the solution is not the indefinite increase in the number of technical and scientific university graduates, of whom there are already a good many in the main advanced countries, but to aim for innovation and individual dynamism, creativity and adaptability, which depend greatly on customs and which must continue to be emphasised in schools and universities, through the humanities: history, philosophy, literature.

Brynjolfsson, McAfee and Spence suggest, with a new spirit, a strategy that is not new but, they stress, "intellectually simple, if politically difficult": stimulus from public investment in fields where the social return is especially high: basic research in science, technology and health; spending on education; and infrastructure, not just highways and airports but also water supply, waste disposal, electric power grids and communications networks. The possible impact of infrastructural investment on short-term demand and medium-term supply has also been forcefully mentioned, among others, by the International Monetary Fund.

Before asking what the future holds for us now, in Europe, we must start from the recognition that there is a serious deficit not only of growth but also of demand, hence of employment and incomes. Strong stimulus for investment, public and private, national and European, is accordingly essential. Even raising the rate of growth in productivity requires well-targeted investments in new technology, to be sure, but also in intangible infrastructures that can generate increasing returns over the medium-to-long term.

In the search for a new model of development, or at least a return to balanced, sustainable economic growth, we can start from Daron Acemoglu and James Robinson's observation on how important it is to maintain a pluralist society and renew our political and economic institutions in a more inclusive direction. Specifically, it is not enough to set out reasonable objectives if the conditions for attaining them are lacking.

Unquestionably the competitive pressures of globalisation and the challenge of computerisation will require major changes in the organisation of work and the adaptation of education, training, and infrastructure. Slowness to adapt would constitute a third cause of stagnation, recently noted by Barry Eichengreen, in alternative or in addition to the lack of demand, as posited by Larry Summers, and the slowdown in productivity growth prognosticated by Bob Gordon, a cause which could become the most important of all.

That said, the risks of technological unemployment are aptly, if somewhat controversially, summarized in Tony Atkinson's recent remark that "the direction of technological change should be an explicit concern of policy-makers, encouraging innovation in a form that increases the employability of workers and emphasises the human dimension of service provision".

What we should do is not so much fear the direct impact of the new technologies and computerisation on jobs as work to take advantage of the enormous cost reductions that will derive from them. The growth of innovative industries is now the principal engine of growth in employment and in productivity. In an influential book Enrico Moretti shows that every high-tech job created in a given US metropolitan area has been accompanied by five new jobs in the

traditional, low-skilled, low-education sectors. Perhaps the level of generality of this result still needs to be established, but it is indicative of the powerful effect of innovation. What is certain is that people will have to work in different ways, in different jobs and different places, over a career span marked by continuous, lifelong learning and training.

All in all, we must acquire the skills necessary for the twenty-first century: critical thinking, aptitude for problem-solving, creativity and acceptance of innovation, the ability to communicate effectively, and openness to cooperation and group work. At the same time, we need to continue investing in knowledge, in our schools and universities: “an investment in knowledge pays the best interest” as Benjamin Franklin eloquently stated in his famous Almanac. Today even more than in the past.

I am also convinced that a good deal of our progress depends on membership in the European community. The path towards full European Union appears rocky, today. But there would still be much to be gained if the EU member states could pool certain substantial portions of their budgets – infrastructural investment, research, defence and security – as part of the process that will, or should, lead from Economic and Monetary Union through Banking Union to Political Union.

To conclude, the times are still changing. The times are always changing. More than seeking to anticipate change, what matters is to be ready, to seek out and create better conditions for seizing the opportunities and reducing the risks brought about by this change, to pave the way for progress that is broadly and equitably distributed.