

STRUCTURAL PERSPECTIVES ON EUROPEAN EMPLOYMENT: THE ROLE OF INNOVATION AND GROWTH

Christopher Pissarides
London School of Economics and
University of Cyprus

ABSTRACT

I examine the factors that lead to more innovation and growth and show the gaps that exist in Europe, especially in recent years. I evaluate the impact of growth on structural change and on the job creation and job destruction of jobs. I argue that although growth can bring benefits to everyone there are also risks, such as job displacement and inequality in earnings, which need policy action. An examination of data from the United States and the European Union shows that the main employment implications of growth are shifts of jobs from the innovating sectors to labour-intensive services connected with business and real estate, retailing and health and education.

1 INTRODUCTION

. Innovation is essential in order to maintain a country's competitiveness in an open world economy. Strong competitiveness is a pre-requisite for wealth creation, high wages and high-quality job creation. When there is a loss of competitiveness a country does not export enough and foreign goods replace domestic production. If exchange rates are free to fluctuate its exchange rate depreciates, making the imported goods more expensive. The country's citizens become poorer because they have to pay more for imported goods out of fixed wages. With fixed exchange rates the situation is even worse: the equilibrium is unsustainable because the country cannot pay for imported goods and it cannot produce competitively at home.

When there is innovation the productivity of labour increases, wages and profits rise, trade shifts in the country's favour and domestic wealth increases. This is what drives growth that can be sustained over long periods of time. Without innovation there can only be short episodes of growth. There can be full employment, but it will be at lower wages, low productivity and a lot of waste of human resources. Very often this waste is in under-employment in agriculture and domestic services. Wage growth and the creation of "good" jobs depend on innovation and productivity growth.

The important questions that will occupy me in this presentation are what market conditions are conducive to more innovation and growth and how does more innovation influence the dynamics of employment? I will argue the obvious – that innovation and growth can benefit all sections of society but policy is often needed to give extra incentives and help reintegrate any losers in the new economy. My focus will be the structural changes that are caused by innovation and growth and the implications that they have for employment.

2 INNOVATION AND ECONOMIC GROWTH

Innovation can raise the productivity of all factors of production so both the owners of capital and the workers can have more income. How this income is allocated between them depends

on their relative bargaining strengths and on market forces. One of the policy concerns in the last two to three decades is that capital owners have been able to secure more of the income than they were in the long period of industrialization that preceded them. This has raised income inequality across different labour market groups with potentially difficult policy challenges.

In general, wealth creation comes from growth and although in the long run innovation is the only driver of growth, there can be lengthy episodes of growth, some of which can stretch to 2-3 decades, without innovation. This mainly comes from above-normal capital accumulation but also from other sources. The employment implications of each growth episode depend on the reason for growth. Growth can come from a reorganization of production, a shaking out of inefficiently employed labour and an improvement in the organization of companies and markets. The impact of this development is very similar to that of innovation in the sense that it increases the productivity of labour, even if it is at the cost of some jobs. It is an innovation in a “general purpose” technology: office and production line reorganization, as opposed to the more easily understood innovation activity that impacts mainly on production directly.

Temporary growth episodes can also come from imitation and capital accumulation that rises above the trends of the past. Growth in Europe after the destructive activities of the Second World War, in Japan a little later and in the Asian “tigers”, including China, in the 1980s and ‘90s was mostly of this kind. This kind of growth can be very fast, creating large amounts of wealth, but it cannot last beyond twenty to thirty years because of diminishing returns to capital. Eventually capital will need to find new and more productive ways of producing in order to maintain its high rate of return.

The only sustainable form of growth over long periods of time is new innovation. New innovation requires research and the incentive to apply the new ideas in the market place. The factors that are needed to make it happen, and drive wealth creation, are a well-trained labour force to generate and apply the discoveries, sufficient investment to enable the replacement of old and unproductive capital equipment, and a market environment that is flexible enough to accommodate the required changes in production before competitors get in first and take the benefits.

Europe as a whole is not doing well along these dimensions, although there are exceptions. It has a well-trained labour force but when judged by the growth of modern technology companies it does not perform very well. The modern technology giants are mostly American or Asian, in particular Korean and Japanese. The way that higher education and research are organized is important in this respect. The best way to achieve results is to combine university research with industrial R&D, as is most successfully done in the United States in places like Silicon Valley, which benefits from its proximity to the high-level universities of Stanford and Berkeley. It is not easy to achieve high standards in research in most countries, to some extent due to educational policies that do not give top-level researchers the incentive to work in those countries. At the level of top research workers are very mobile and they need strong incentives to stay in countries that offer less good facilities through their universities than the very top ones.

The incentives needed by top researchers are not just a high salary that rewards their input into research. In order to achieve high standards in university research universities need to be well-funded and be independent. In most countries and most universities funding is primarily provided by government so it may be difficult for politicians to accept that they should have limited say over salary levels, appointments, promotions and other types of spending when they provide the money from tax revenues. But it is necessary if research is to be free of political interference. This is why there are large advantages to obtaining funding directly from private

industry or distributing state funding through independent bodies, like the National Science Foundation in the United States and the European Research Council in Europe. Interference with the university administrative structures and its internal procedures is less likely when the funding bodies are independent of national politics.

In the United States university budgets are 3.3% of GDP but in Europe they are less than half, about 1.3%. Americans also give more independence to their universities and public donations are more generous. According to influential observers, this is an important reason why Europe lags behind the US in top university performance and top innovations (see Aghion et al, 2008). This is reflected in expenditure on R&D, which is also lagging behind the United States and Japan (Fig. 1). It is still ahead of China but this is not likely to last for long, as Chinese R&D spending has been on an upward trend and it closed a large gap vis-à-vis Europe in the last ten years. But there are exceptions. The success of German industry in producing top-level export manufactures is reflected in its R&D spending.

Successful innovation and growth also require investment because most innovations need new capital. The disembodiment assumptions of traditional economic theory (the Solow growth model) are convenient simplifications, not depictions of reality. In particular, new investment by private companies is needed to embody the new technology and new investment by the public sector is needed to build the infrastructure that is a necessary support for private companies. In total volumes capital formation in Europe is on par with that in the United States, at about 18-20 per cent of GDP (and well below the Asian countries, especially China). But the dynamics of investment in the recent crisis does not bode well for the structural recovery of the heavily indebted countries. In Fig. 2, I show private investment in the United States, European Union and the four “programme” countries. Whereas investment fell everywhere between the peak year of 2007 and 2012, the end of recession year (for most countries), in the heavily indebted countries private investment fell by a lot more than in the other countries.

Public investment, which is more important for the infrastructure that supports productivity growth, tells a similar story (see Fig. 3). In proportional terms, public investment fell more than private at a time when budgets had to be cut to check the explosion of debt. Public investment is the easiest to cut, or “postpone”, amongst government spending programmes, and this shows up especially in the indebted countries of the Eurozone. Whereas in the United States public investment fell by a mere 6% and in the European Union as a whole by 11%, in the four indebted countries it fell between 40 and 60%. This of course cannot be good for their recovery and even for their debt reduction programmes. At a time when GDP levels fell due to recession, a robust way of cutting the debt is to focus the government spending programmes on items that yield a return in the future. Government fixed capital formation is foremost amongst these. In the final analysis, the fault for this fall in infrastructure spending lies with the rescue programmes which did not discriminate between different kinds of government spending.

Innovation and productivity growth also need a well-functioning labour market. Labour markets need to be flexible because innovation carries risks. Start-ups and older firms introducing new products need to know that they can recruit the workers quickly and terminate contracts when things don't work out. Inflexible labour markets make firms too cautious and introduce too many administrative burdens that work as disincentives to innovation. A flexible labour market will not by itself lead to more innovations but it will remove impediments that could slow down the innovation potential of the country. But a flexible market helps in the speedy implementation of innovations and the faster adaptation to new technological conditions. The ability to do this makes countries more competitive in world markets and so gives them additional incentives to invent new cost-cutting techniques.

The same applies for product market regulation, including the enterprise environment. High start-up costs, either as direct payments or administrative procedures act as disincentives to the formation of companies and to the dissolution of unsuccessful companies. High administrative operating costs have similar effects and encourage the development of an underground economy, which is a strong disincentive to new innovation. When a job is not secure because it is not registered and regulated neither the employee nor the employer has an incentive to engage in research or training that improves the productivity of the workforce.

The reward structure within the company and in the labour market as a whole should be such that it rewards the successful innovators more generously than the rest, even if the input is similar. The incentive to innovate is bigger when success brings big payoffs. But here one needs to be concerned about inequality as larger inequality due to large rewards to successful innovators will create tensions and potential conflict. The balancing of financial incentives for top innovators with sufficient payoffs for lower-level employees is a very fine act and may vary from country to country and even from company to company. It is a challenge for every policy maker in the developed world.

Finally, a labour market needs to be competitive to attract new innovation. Even in situations where a large player dominates the market, there should be no barriers to entry that can give protection to the incumbent. In market environments where there is either actual or potential competition from new entrants the incentive to innovate is greater because the incumbent needs to innovate to keep ahead of the competition. When monopolies are protected as in so many state controlled enterprises the incentive to innovate disappears and the company stagnates.

3 INNOVATION, JOB CREATION AND JOB DESTRUCTION

Innovation brings wealth creation and more prosperity but how does it influence employment? The best way to share the rewards from new growth is through employment – namely, it is to ensure that growth is inclusive. The important question to ask then is about the ways in which innovation and growth influence new job creation and whether any displaced employees are absorbed quickly back into employment.

Many commonly heard answers about the relation between innovation and jobs suffer from what one might call an aggregation fallacy. There is no doubt that a company that is a successful innovator creates more jobs, but usually this is at the cost of jobs at its competitors. Even if the company is a perceived monopolist this is still the case. For example, Google displaced a lot of jobs in non-digital advertising and selling, even though a newspaper may not be regarded as its direct competitor. Amazon displaced many jobs in high street bookstores. But if we aggregate over all companies in a sector we find that innovation usually destroys jobs in the sector as a whole. The jobs created by the innovator are not enough to replace all jobs destroyed in the competitor firms that fail to innovate. It is very likely that fewer person-hours are today employed to sell a euro's worth of books than before Amazon was created. But at the level of the economy as a whole innovation creates jobs through the wealth creation and higher incomes of those working for the successful innovators. The jobs are created elsewhere, usually in labour-intensive services.

To put it in terms of supply and demand, when a sector innovates it increases its own supply; demand for the sector's output does not usually increase by a similar amount and so the increase in the sector's supply spills over to other sectors, creating demand elsewhere in the economy; employment shifts from the innovating sector to the less innovative labour-intensive

sectors. Such shifts spread the benefits from sector-specific innovations more widely and make growth more inclusive. They underlie the structural perspective of employment that is the topic of this session.

Historically, innovation has been uneven across sectors of the economy. Before looking more deeply into the implications of this for employment, I discuss more generally the type of jobs that are created in the economy as a whole when there is new innovation in some sectors.

Usually the jobs that are created to absorb the workers who are displaced by innovation are in service sectors where the possibilities for labour-saving technology are limited. Such jobs are in both business and personal services. As businesses become larger and more complicated with new and more specialized technology they hire more specialist service providers. These could be hired by the firm to provide the services internally, in which case they are classified as workers in the sector of the firm, or the firm buys the required services from specialist providers (outsourcing), in which case the workers providing them are classified as business services employees. Distinguishing between the two in official statistics is difficult; although it is generally agreed that there has been net growth in business services everywhere in the industrialized world, the claim has been made that much of the growth in business services that we see in official statistics is due to outsourcing.

Job creation in the personal services sector is much more straightforward to understand. As wealth grows households travel more, consume more and require better service that saves them time, a resource that becomes more valuable with rising living standards. This is reflected in the growth of jobs in retailing, catering, health care, child care, education and domestic service. Despite many technological improvements that benefit these types of jobs, especially retailing, in the final analysis they are jobs that provide services directly to the public relying on person-to-person contact. For example, in retailing technological improvements in stocking and re-ordering may accelerate the time needed to deliver products but when visiting a store the customer evaluates the quality of service from the personal contact that she has with the retail assistants. Similarly, domestic service has been revolutionised with the invention of consumer durables and gadgets; but, although one might safely argue that the number of domestic employees is not as big as it was at the beginning of the twentieth century, the numbers of employees in domestic jobs recorded in official statistics is growing as incomes grow.

Jobs in both business and personal services could be well-paid jobs but there is no guarantee that they will be, especially the ones in the personal sector. In contrast, the profits that go to the innovators that displaced the workers in the first place are usually very high, otherwise the incentive for innovation would not be present. This may sound like reverse causation and indeed there is an element of it. Countries that do not offer high rewards to innovators may end up with less inequality between the innovators and the service providers but they will also be characterised by less innovation. Countries that permit the growth of large inequalities attract more innovation activity and the final outcome is the one that I have described; high profits go to the innovators and whether wages in the jobs created elsewhere are also high depends on other factors. We see in this the risk of increasing inequality in innovating countries. Balancing the two – the high rewards necessary for innovation with the desire to raise wages across the board – is one of the biggest challenges that societies face today.

The relative rewards from new innovations in the digital age in a country that rewards innovators handsomely are well illustrated by an article in the New York Times a couple of years ago. It was headed, Apple's Retail Army, Long on Loyalty but Short on Pay. Apple is at the forefront of the new digital technology. Its stores take in more per square foot of space than any other retailer in the United States. But as the New York Times explains, the majority of Apple

employees are not highly paid engineers or executives but hourly paid employees selling its products. 30,000 of its 43,000 US employees in 2012 were hourly paid workers earning about \$25,000 a year. The Chief Executive in the same year received total compensation, including stocks that he could not cash-in yet, worth more than 500 million dollars. There are no inherent pressures in US-style capitalism to give incentives to senior management to compensate generously all workers in a successful innovator. Competition for jobs and workers at the lower end of the skills distribution is keeping wages low but at the upper end of the big innovation successes competition is not as effective because the main players are small in number and have with unique features.

4 INNOVATION-INDUCED STRUCTURAL CHANGE AND JOB CREATION

I now look at the dynamics of employment during periods of growth and structural change, beginning with a long-term look at the United States. I choose the United States for this because it is the leading nation in innovation and its implementation. It also has reliable data going back more than 100 years. Similar stories can be told about other industrialized economies and I will refer to some important cases.

In 1900 in the United States, when industrialization was well under way, 35% of employment was in agriculture, another 35% in industry and the remaining 30% in services. Agriculture was mainly based on family concerns and was inefficient. Services were also inefficient. Large numbers of new immigrants were working in domestic service, looking after the children and homes of rich industrialists. John Leeds (1917), in one of the very first house-to-house surveys of working conditions in Philadelphia, found that middle class homes employed a large number of people in early 20th century, working as cleaners, washers, clothes makers and maintenance workers. Then the big innovations started reaching the general public: cars, refrigerators, washing machines, vacuum cleaners and the many other household appliances that today we take for granted. There has never been a more intense period of innovation and there will probably never be one again. People became wealthier and demand for all kinds of goods and services grew rapidly. But the share of employment in industry where all this growth started increased just a little, from 35 to 40%. It remained at 40% until 1970 when the big innovations came to an end and growth slowed down. It subsequently declined to 20%, in the face of competition from Europe and Asia which copied US technology. The domestic service that John Leeds found in 1900 had virtually disappeared, the workers being displaced by machines. Agricultural employment also virtually disappeared, falling from 35% of total employment at the beginning of the twentieth century to 3% at the end. The main beneficiary from all this growth was services, which now account for more than 70% of employment.

This story illustrates that innovation is needed to increase a country's wealth and competitiveness but the jobs created to employ the citizens of the innovating country are not in the sectors that experience most productivity gains. The jobs are created elsewhere, where productivity gains are much smaller, because wealthy citizens are also big spenders and want professionals to look after them when they are sick, to educate their children and manage their businesses and properties (see Baumol, 1967, Ngai and Pissarides, 2008, and references therein about productivity differences across sectors).

European countries share this experience. Consider three, the UK, Germany and Sweden. The data that we have come from the sectoral data set KLEMS, which goes back to 1970. I report consistent data for the population aged 15 and above for the United States and the three European countries. In Figure 4 I report overall employment rates for 1973, the year of the productivity slowdown, 1983, when productivity turned mostly up and 2003 (some updating is

forthcoming). Sweden is the only country that succeeded in increasing overall employment between 1973 and 1983 but it did it through a large expansion of its public welfare programmes. Industrial employment declined everywhere and service employment increased. Comparing 1973 with 2003, overall employment rates changed a little, except in the United States where they grew faster, due to the growth of female participation rates. The more interesting data for our purposes is shown in figure 5. The decline in industrial and agricultural employment was replaced, with some overall gains as shown in figure 4, by business services and services catering for the individual (including health and education) in approximately equal measure.

The implications of this transition for policy, in Europe and elsewhere, are clear cut. Give incentives to R&D to speed up productivity growth, especially in industry. Liberalise services, making it easier to start and run new businesses, to absorb the workers released by industry and draw more women into the market. Women have a comparative advantage in the performance of service jobs. Especially older women, whose participation is weak, have a big advantage in health care jobs, which is a major growth sector. Sweden has succeeded in drawing into the market women of all ages through the subsidisation of jobs where female labour has the advantage, especially in the health and education sectors (see figure 6). The United States and Britain have also been more successful in employment growth in these sectors, mainly through the expansion of their higher education sectors.

5 PRODUCTIVITY GROWTH AND AGGREGATE EMPLOYMENT

Economists often find it a challenge to rationalize the relation between productivity growth and overall employment levels. A similar difficulty arises when explaining the relation between productivity growth and unemployment. Economic theory helps more in our understanding of the relation between the level of productivity and employment than it does in our understanding of the relation between growth in productivity and employment (or unemployment). Yet, statistically there seems to be a positive correlation in both cases (Pissarides and Vallanti, 2007).

An economy that has higher productivity can afford to pay higher wages for market work. The interaction between wages and productivity has two implications for employment. The first is that higher wages attract a bigger supply of labour, mainly through bigger rates of participation of women and older persons. The second is that higher productivity brings more success in international trade.

The trade-offs that influence the participation of women and older persons are associated with comparing the advantages of staying at home and engaging in “home production”, work that is not paid for but is consumed by the household, or participating in market work and “marketizing” the home work; eating in restaurants more frequently, employing childminders and cleaners, and the like. In countries where market work is more rewarding marketization is more common and employment rates are higher. The driving forces for this effect are the higher wages that more productive labour could attract (Freeman and Schettkat, 2005; Ngai and Pissarides, 2008)

International trade is another influence on employment that is linked to productivity. More productive countries export more because their products are more competitive in international markets. More exports mean a larger tradable sector, which is entirely market based, and so more market activity. More trade is also associated with more wealth and so more demand for labour-intensive services.

Productivity growth is also a big influence on employment and unemployment. In traditional static models of labour market equilibrium there should be no connection between productivity growth and employment or unemployment. But statistically there is such a relation. In order to rationalise it we need to think in dynamics terms; namely think of job creation as a capital investment. The employer invests in the creation of the job position and spends resources on recruitment, which are costly because of search for the right person, training on or off the job and initial capital outlays. In such an environment there is a “capitalization” effect on job creation due to productivity growth. When the employer anticipates productivity growth she hires more intensively so as to be able to take advantage of the higher productivity when it arrives. This has an impact on both employment and unemployment.

6 REFERENCES

Aghion, P., M. Dewatripont, C. Hoxby, A. Mas-Colell and A. Sapir (2008). *Higher Aspirations: An Agenda for Reforming European Universities*. Bruegel Blueprint vol. V, Brussels: Bruegel Institute

Baumol, W. (1967). “Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis”, *American Economic Review* 57, 415-426

Freeman, R. and R. Schettkat (2005). “Marketization of Household Production and the EU-US Gap in Work”, *Economic Policy*, January pp. 5-50.

Leeds, J. (1917). *The Household Budget: With a Special Inquiry into the Amount and Value of Household Work*. Columbia University, Ph.D. dissertation.

Pissarides, C.A. and L.R. Ngai (2008). “Trends in Hours and Economic Growth”, *Review of Economic Dynamics*, 11, 239-256

Pissarides, C.A. and G. Vallanti (2007). “The Impact of TFP Growth on Steady-State Unemployment”, *International Economic Review*, 48, 607-640.

The New York Times (2012). “Apple’s Retail Army, Long on Loyalty but Short on Pay”, *New York Times*, June 23, 2012 Available at http://www.nytimes.com/2012/06/24/business/apple-store-workers-loyal-but-short-on-pay.html?_r=0