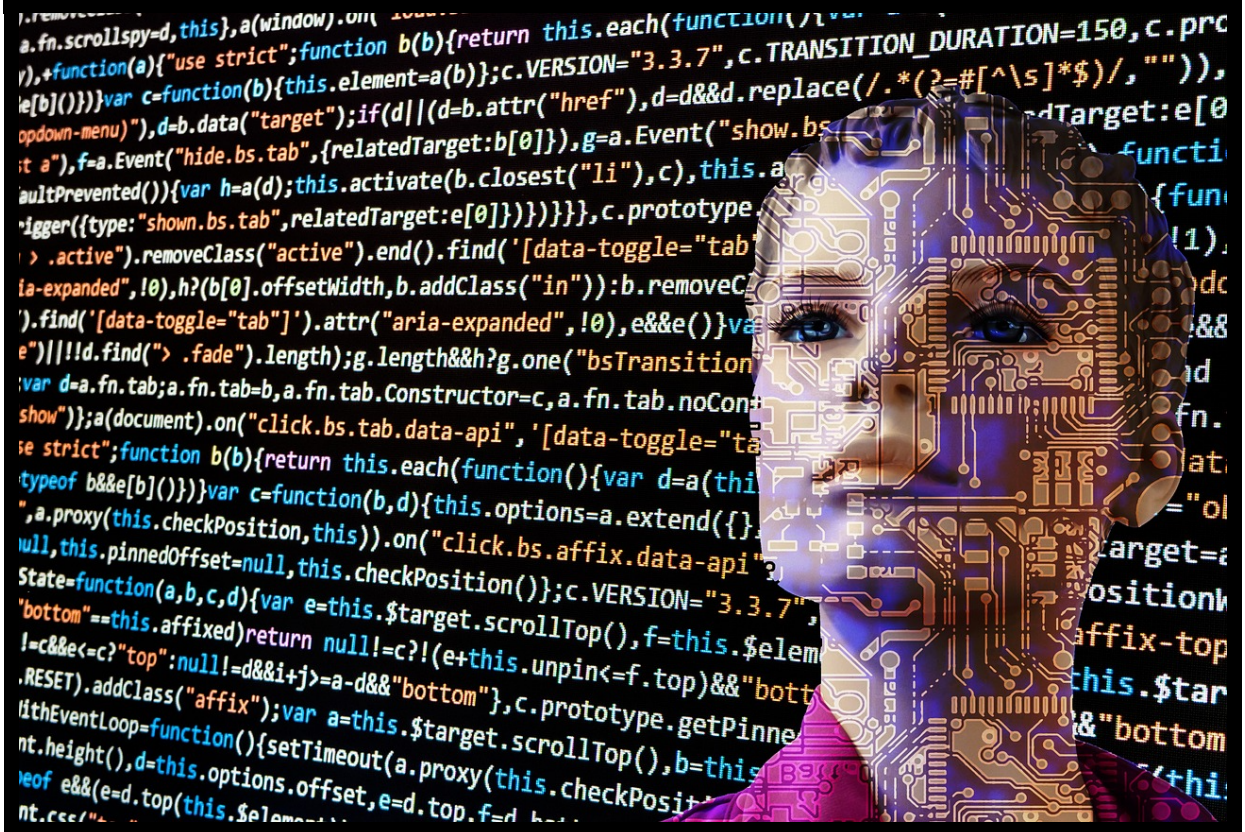
European Commission

The Future of Work

Automation & Employment



Social Situation Monitor
Research Seminar

Friday 10 November 2017
11:30 – 16:10

Hall 300
The Square
Glass Entrance
Mont des Arts/Kunstberg
B-1000 Brussels

Employment, Social Affairs and Inclusion

About the seminar

The Social Situation Monitor

Each year the Social Situation Monitor (SSM):

- Carries out policy-relevant analysis and research on the current socio-economic situation in the EU on the basis of the most recent available data;
- Examines major issues which are features of the situation or affect it with the aim of providing evidence on which to base policy-making across the EU.

This initiative is directed by the London School of Economics (LSE), in consortium with ICF, on behalf of the European Commission. The team is led by the Academic Director, Dr. Bob Hancké from LSE, and the Project Director, Dr. Simona Milio from ICF. The team is composed of renowned academics and researchers from the consortium organisations reflecting a wide range of expertise.

More information can be found at:
http://ec.europa.eu/social/main.jsp?catId=1049&

The SSM seminar series

SSM seminars are research seminars. Their aim is to provide a forum to discuss the theoretical, methodological and policy implications of the latest economic and social research. More specifically, SSM seminars aim to inform:

- The economic and social analysis of the European Commission in general, and the Commission's *Employment and Social Developments in Europe* review in particular*.
- The economic and social analysis of the European Commission's stakeholders.
- The economic and social policies of the European Commission and its stakeholders.

SSM seminars are primarily intended to:

- Economists and analysts working in policy-making organisations;
- Academic researchers;
- Policy officers with an interest in economic and social analysis.

(*) The *Employment and Social Developments in Europe* reviews can be found in the European Commission's publications catalogue:
http://ec.europa.eu/social/main.jsp?catId=1285&langId=en

Seminar agenda

11:30 – 12:30	**Registration and Buffet lunch**
12:30 – 12:40	Welcome words By Barbara Kauffmann (European Commission)
12:40 – 12:50	Introduction to the seminar By Bob Hancké (LSE)
12:50 – 13:00	*Robots at work: A note on the trends of automatable and non-automatable employment shares in the EU* By Grace Lordan (LSE)
13:00 – 13:20	*The impact of industrial robots on workers* By Wolfgang Dauth (University of Würzburg)
13:20 – 13:40	Discussion Chaired by Bob Hancké (LSE)
13:40 – 14:00	*Are robots stealing our jobs?* By Marco Vivarelli (Università Cattolica del Sacro Cuore, Milan)
14:00 – 14:20	Discussion Chaired by Bob Hancké (LSE)
14:20 – 14:40	**Coffee break**
14:40 – 15:00	*Digitalisation and the Future of Work: Macroeconomic consequences for tomorrow's employment, unemployment and wages* By Ulrich Zierahn (ZEW)
15:00 – 15:20	Discussion Chaired by Bob Hancké (LSE)
15:20 – 15:40	*Routinization: How robust is the evidence for the EU?* By Federico Biagi (JRC Seville)
15:40 – 16:00	Discussion Chaired by Bob Hancké (LSE)
16:00 – 16:10	Concluding remarks By Loukas Stemitsiotis (European Commission)

Barbara Kauffmann, DG EMPL Director opened the seminar. She highlighted the importance of understanding the impact that automation has on employment for DG EMPL and the European Commission. The broader question of the future of work, which presents challenges, but also opportunities, is on the agenda of the current and forthcoming presidencies. The Commission has put forward several initiatives addressing the topic such as the European Pillar of Social Rights (including the Written Statement Directive and the Initiative on access to social protection), and the new Skills Agenda for Europe. The outcome of the seminar is expected to feed the next Employment and Social Developments in Europe report to be published in June 2018.

Robots at work: A note on the trends of automatable and non-automatable employment shares in the EU

By Grace Lordan, Associate Professor at the London School of Economics and Political Science (UK)

Grace Lordan presented an ongoing study that will document the share of non-automatable and automatable jobs in EU countries. Specifically, the study will define the quantity of tasks that are automatable within each occupation by drawing on definitions provided in Autor and Dorn (2013) and Autor et al. (2015). This will highlight whether different countries have experienced different trends in labour allocation away from automatable jobs. The well accepted definitions put forward by Autor and Dorn (2013) and Autor et al. (2015) are useful for a retrospective analysis. However, there is a seismic change on the horizon with respect to the jobs that will be automated in the near future. Therefore, the study will repeat the analysis, following Lordan (2017), re-defining occupations as automatable if there has been a lot of research and development in creating substitutes (as defined by patent activity on Google patents), plus some success with these substitutes on the market. In this way the study will identify the countries holding the highest share of jobs that are expected to become automatable in the next decade.

This short presentation was not followed by a Q&A session.

The impact of industrial robots on workers

By Wolfgang Dauth, Assistant Professor at the University of Würzburg (Germany)

Wolfgang Dauth presented a new study analysing the impact of rising robot exposure on the careers of individual manufacturing workers, and the general

equilibrium impact across industries and local labour markets in Germany. The study finds no evidence that robots cause total job losses, but they do affect the composition of aggregate employment. Every robot destroys two manufacturing jobs. This accounts for almost 23% of the overall decline of manufacturing employment in Germany over the period 1994–2014, roughly 275,000 jobs. But this loss was fully offset by additional jobs in the service sector. Moreover, robots have not raised the displacement risk for incumbent manufacturing workers. Quite in contrast, more robot-exposed workers are even more likely to remain employed in their original workplace, though not necessarily performing the same tasks. The aggregate manufacturing decline is solely driven by fewer new jobs for young labour market entrants. This enhanced job stability for insiders comes at the cost of lower wages. The negative impact of robots on individual earnings arises mainly for medium-skilled workers in machine-operating occupations, while high-skilled managers gain. In the aggregate, robots raise labour productivity but not wages. Thereby they contribute to the decline of the labour income share. Policy makers should worry about distributional implications.

It was pointed out during the discussion that Dauth's study was a real contribution insofar as there is currently very little literature on the spill-over effects of automation. This being said, future research will need to distinguish different types of spill-over: (i) between firms, (ii) between sectors, and (iii) between regions. For each of these types of spill-over, it will be interesting to find out whether the effect is positive, negative or nil. Regardless of their direction and magnitude, spill-over effects have important policy implications, as they indicate where government intervention is most/least needed.

Are robots stealing our jobs?

By Marco Vivarelli, Professor of Economics, Director of the Institute of Economic Policy at the Università Cattolica del Sacro Cuore, Milan (Italy)

Marco Vivarelli presented a study assessing the employment impact of different types of investments in innovation using a representative sample of Spanish and Italian manufacturing firms over the period 2002-2013. His estimates generate various results, some of which would seem to contradict the existing literature. Indeed, estimations carried out on the entire sample do not provide statistically significant evidence of the expected labour-friendly nature of innovation. More in detail, neither R&D nor investment in innovative machineries and equipment (the so-called embodied technological change, or ETC) turn out to have any significant employment effect. However, the job-creation impact of R&D expenditures becomes highly significant when the focus

is limited to the high-tech firms. On the other hand – and interestingly – ETC exhibits its labour-saving nature when SMEs are singled out.

Several points were made during the discussion:

- The employment impact is not the same for companies that are "occasional innovators" and for companies that are "persistent innovators". While the literature suggests that the employment effect is larger for the latter group, it is very difficult to test this hypothesis empirically.
- The stringency of competition policy can mitigate these employment effects. So it is important to look beyond employment programmes to mitigate the effects of automation.
- Robots do not only have an impact on the quantity of jobs, it also has an impact on the quality of jobs. Keynes would have argued that automation (i) replaces low-quality jobs with higher-quality jobs; (ii) might result in shorter working times; and (iii) drives wages up.
- The flexibility of local labour markets is an important moderator of the effect of automation on jobs.

Digitalisation and the Future of Work: Macroeconomic consequences for tomorrow's employment, unemployment and wages

By Ulrich Zierahn, Senior Research at ZEW (Germany)

Ulrich Zierahn started his presentation by highlighting the controversial public debate that is taking place on the consequences of an increasingly digitalized world of work on the society and economy. Fears are raised that jobs might be increasingly at risk due to the use of machines and intelligent algorithms. These fears are fuelled by studies, which suggest that almost every second job might be automatable. In the public discussion, these technological potentials are often misinterpreted as potential employment effects. Macroeconomic employment effects of technological change, however, depend on adjustment processes, such as the creation of new jobs and industries. Studies which take into account such mechanisms typically find little effects of automation and digitization on aggregate employment, although they usually also report large structural changes. The key question therefore is not how many jobs, but which jobs we will have in the future. Recent results suggest that automation and digitization lead to a large restructuring of occupations, industries and job tasks. This raises the pressure to adapt particularly for low-qualified workers, as the growing jobs typically require higher qualifications than declining jobs.

Digitization may thus raise inequality and reduce labour market opportunities for low-qualified workers.

Several points were made during the discussion:

- The model has not been used for forecasting to date, but it will be used to provide a simulation for upcoming years. The key parameters of the model are stable for a horizon of five years.
- The structure of employment is essential to understanding the implications of automation for the labour market.
- There should be a focus not just on how many jobs can be automated, but also on the diffusion of technology into the economy.

Routinization: How robust is the evidence for the EU?

By Federico Biagi, Senior Researcher at the Joint Research Centre (Italy)

Federico Biagi's study focuses on the robustness of measures for routinization in the EU. Biagi compared the indices of routine intensity obtained from different datasets (EWCS, PIAAC, PDII, O*NET) to provide a broad picture of routinization in the EU, also focusing on across-time changes. For each occupation he computed an abstract, a routing and a manual index, which are then computed at country level (using LFS occupational weights). He obtained the following results: PIAAC, O*NET, and PDII give similar results, while results from the EWCS appear to differ in terms of both value and range of the indexes; countries in the North have high abstract index and low routine and manual indexes, while it is the opposite for the countries in the south and east; even if employment is declining in routing occupations, all occupations are becoming more routine intensive. These results raise questions about digitalisation increasing the changes of labour substitution and inequalities.

Several points were made during the discussion:

- Variations in the tasks as defined by researchers/authors may result in different outcomes.
- It is possible that the observed North/South and North/East divide is the result of differences in the work organization and business models.