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The Future of Work: Challenges for Men and Women

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Occupational restructuring is one of the most significant recent changes in the labor markets. Occupational gender segregation means that it may have very different impacts on men and women. In this article, I describe occupational restructuring, the driving forces behind it, and how it may affect men and women.

Occupational restructuring

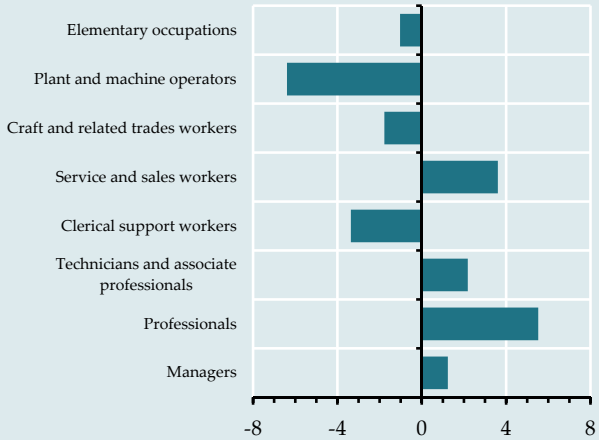
Occupational restructuring is one of the major developments in the labor markets. International empirical evidence has firmly established that occupational structures have changed markedly in developed countries over the last 20 years (Goos et al., 2014). This occupational restructuring has been characterized by job polarization: employment has increased in low-paying and high-paying occupations while it has declined in middle-paying occupations (Goos and Manning, 2007, Acemoglu and Autor, 2011; Goos et al., 2014). This phenomenon has also shaped the Finnish labor market significantly (Asplund et al., 2012; Mitrunen, 2013, Böckerman and Vainiomäki, 2014).

Figure 1 shows how occupational structures changed in the Finnish private sector from 1995 to 2008. The employment share of managers, professionals, technicians, and associate professional and service and sales workers has increased, while the employment share of clerical support workers, craft and related trade workers, plant and machine operators, and elementary occupations has declined.

Many of the declining occupations have been in the middle of the wage distribution, whereas the occupations that have increased their employment share can be found at both ends of the wage distribution.

Occupational restructuring may affect men and women differently due to occupational gender segregation (e.g. Goos and Manning, 2007; Dwyer, 2013). Figure 2 shows the extent of occupational gender segregation in the Finnish private sector in 2015. As can be seen, men more commonly hold managerial positions and traditional blue-collar jobs, such as craft and related trade workers and plant and machine operators, whereas women are more commonly employed in service and sales positions. Professional occupations are the most equal in terms of gender.

1 Change in the employment share of occupations in Finland, 1995–2008 (percentage points)



Source: Kauhanen and Lilja (2014). ETLA

2 Occupational segregation in Finland 2015, %

Source: Labour Force Survey, Statistics Finland. ETLA

To understand how occupational restructuring may affect men and women differently, we need to understand the drivers of occupational restructuring. We turn to this question next.

Drivers of occupational restructuring

There are two main drivers of occupational restructuring. First, technological change has enabled the automation of routine-intensive jobs while increasing productivity in non-routine tasks (Acemoglu and Autor, 2011; Autor and Price, 2013; Autor and Dorn, 2013; Autor, 2014; Goos et al., 2014). Second, many clerical and blue-collar manufacturing jobs have been offshored (Blinder and Krueger, 2009; Goos et al., 2014). Next we take a look at these drivers in more detail.

ICT and robotics

ICT and robotics have very different implications for different tasks. The following classification of tasks helps in analyzing the effects of these technologies (Autor et al., 2003; Levy and Murnane, 2004):

1. Expert thinking. These tasks deal with problems that do not have rules-based solutions. In other words, these tasks require creative problem solving. Most tasks in professional occupations fall into this category.

2. Complex communication. These tasks require interpersonal communication to acquire or transmit information or encourage others to act based on the information. Many tasks in sales and management occupations belong to this category.

3. Cognitive routine tasks. These are mental tasks that can be described with rules-based logic. Many simple clerical tasks, such as billing and the approval of applications, belong to this group.

4. Manual routine tasks. These are physical tasks that can be described with rigid rules. Many tasks in product assembly belong to this category.

5. Manual non-routine tasks. These are physical tasks that require fine-motor skills and perception. Examples are the cleaning of buildings and driving a car in the city.

ICT and robotics affect these tasks very differently. Computers are useful for tasks that can be described in deterministic rules, that is, programs. This means that, for example, cognitive routine tasks can be completely automated. The same applies to manual routine tasks.

Occupations that involve a great deal of expert thinking and complex communication are harder to automate with the currently available technology. However, computers increase productivity in these occupations enormously by making more information available and enhancing the ability to analyze and communicate that information. Moreover, recent advances in artificial intelligence mean that, in the future, some of these tasks may also be automated (Brynjolfsson and McAfee, 2014).

Manual non-routine tasks are least affected by advances in technology. They cannot be automated, nor does technology increase productivity in these tasks. This is bound to change in the future, however, as technological progress means that many of these tasks will become routine manual tasks. For example, it is likely that we will have cleaning robots in the future.

The impact of technological progress on occupational restructuring can be seen in Figure 1. The occupations that have declined involve a lot of routine tasks. Many of the tasks in the traditional blue-collar occupations are manual routine tasks, and clerical support workers mainly perform routine cognitive tasks. The in-

crease in the employment share of professionals and managers reflects the same underlying forces. Technological change has increased productivity in expert thinking and complex communication, which has increased the demand for professionals and managers.

The threat of computerization is smaller for highly educated individuals and those in the public sector. This is because the tasks performed by the highly educated fall mainly into the first two categories above, and there are fewer routine tasks in the public sector than in the private sector. One reason for this is the importance of healthcare and education in public sector employment.

Offshoring

Technological progress and the liberalization of international trade have led to an increase in trade in tasks (Baldwin, 2006). The costs associated with global operations have decreased significantly, which has led firms to globalize their value chains. Thus, many organizations globally source the tasks that their operations require. Tasks such as management, finance, R&D, production, and sales can be performed in different locations across the globe.

Some tasks are easier to offshore than others. Goos et al. (2014) classified occupations based on how easy they are to offshore. Their classification shows that more easily offshorable occupations include clerical support workers, craft and related trade workers, and plant and machine operators. Occupations that are harder to offshore include managers, professionals, and service and sales workers. These results are in line with the pattern evident in Figure 1.

Technological progress will allow a larger share of occupations to be offshored in the future.

The future of occupational restructuring

The driving forces behind occupational restructuring will continue to operate in the future. The development of ICT, robotics, and artificial intelligence means that more and more tasks will be "routine." Machines are able to replace human labor in a wide range of tasks. Similarly, technological progress will make the offshoring of various tasks more profitable. In the next 10 years, occupational restructuring will likely continue.

However, advances in automation will not mean an end of work. Technological progress opens up possibilities for new tasks and jobs, and in many cases these new jobs are beyond our imagination. For example, 30 years ago there were no web designers, so even imagining that kind of job was nearly impossible.

Occupational restructuring, men and women

Technological change and offshoring may affect men and women differently through occupational restructuring. Until now, occupational restructuring has affected men and women similarly. Automation and offshoring have reduced the demand for labor in both male-dominated (e.g., blue-collar occupations in manufacturing) and female-dominated occupations (e.g., clerical support workers). Similarly, employment is increasing in both male- and female-dominated occupations.

Recent Finnish research shows that labor market restructuring has had a small positive impact on the gender wage gap. Kauhanen and Maliranta (2015) showed that in the Finnish private sector, labor market restructuring has increased the wages of women more than those of men, although the impact has been modest. They also emphasized that the effects of restructuring are complex and dependent on the sector and time period. Thus, it is difficult to forecast how labor market restructuring will affect men and women in the future. On one hand, automation threatens employment less in the public sector, where the majority of employees are women. Women are also more educated than men, which makes them less susceptible to computerization. On the other hand, there are indications that employment in the STEM fields (science, technology, engineering, and mathematics) will increase in the future. With the current educational segregation, this will favor the employment of men.

Restructuring and segregation

The long-term effects of occupational restructuring on gender equality in the labor market depend largely on the impact that the restructuring has on occupational segregation. Occupational restructuring will continue in the future, and this means that many persons already in the labor market will have to change their

occupations. In addition, new generations will enter a very different labor market in terms of occupational employment opportunities compared to earlier generations.

These changes open up the possibilities for reduced occupational gender segregation. Persons who need to look for a new occupation may want to consider positions traditionally dominated by the other gender if employment prospects are better in such occupations. Similarly, persons entering the labor market for the first time may want to cross traditional boundaries due to the employment opportunities that they face. There may be fewer opportunities in the traditional fields and more opportunities in the non-traditional fields. Such a crossing of traditional boundaries may be helped by changes in tasks within occupations. For example, healthcare jobs may use more technology in the future, which may lower the barrier for men to enter these traditionally female-dominated occupations. Technological developments may also make it easier to combine work and family life, which may reduce gender disparities within occupations and also help women to enter occupations where they have traditionally been underrepresented (Goldin, 2014).

The demand for skills in the future

Occupational restructuring challenges the skills of both men and women in the labor market. Automation means that the demand for both cognitive and manual routine skills will diminish. Persons possessing such skills will have to acquire new skills that are rewarded in the labor market. On the other hand, the demand for abstract tasks will increase. This may especially be true with regard to skills in the STEM fields. The rapid progress of technology means that in the future, the demand for different types of skills will evolve even more rapidly.

The acquisition, maintenance, and renewal of skills will be critical for both men and women in the future labor markets. This is an important challenge for our educational system. We need a flexible adult education system that makes it possible to develop skills throughout one's career.

Conclusion

Occupational restructuring is one of the most important developments in the labor markets. This restructuring has been characterized by job polarization: employment has increased in low-paying and high-paying occupations while it has declined in middle-paying occupations. Occupational restructuring is driven by technological progress and offshoring.

Occupational restructuring may affect men and women differently because of occupational gender segregation. To date, occupational restructuring has affected men and women quite similarly. The long-term effects of occupational restructuring on gender equality in the labor market depend largely on the impact that the restructuring has on occupational segregation. If it helps in reducing occupational segregation, it will improve gender equality in the labor market. In any case, the restructuring of labor market challenges the skills of both men and women and poses a significant challenge for our educational system.

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