

Digitalization and resilience: evidence from Swedish regional labor markets

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Extended abstract

The increase in economic polarization is well documented around the world, Goos et al. (2014). Middle income earners have become fewer in numbers while the shares of low- and high pay jobs have increased. In the US, median income earners have even experienced stagnant wages. It is well known that peripheral and more rural regions have been losing jobs and prosperity to urban areas, and while much research is focused on globalization and technological change at the macro level, our knowledge of how such processes operate at the micro level is relatively limited. Our understanding of how such structural change stem from empirical work that measures economic resilience at the regional level. Patterns of urbanization dictate large and persistent disparities across local labor markets, not only in terms of number of jobs available, but also the type of jobs available. While the increase in versatile and all-purpose robots is further reducing the need for manufacturing jobs, various types of services are also being transformed or redefined by software and by platform-based labor markets in the cloud. Parts of work that are characterized as routine tasks can to an increasing extent be automated by both mechanical and software robots; the result is a reduced demand or outsourcing for such services. By contrast, the demand for non-routine and cognitive/creative tasks is increasing. The combined effect is a development that favors those with high-skills (so called skilled-biased technological change). One consequence is further increase in interregional migration through positive self-selection. Essentially, the young and those with higher human capital tend to move to more urbanized areas, which results in a strain on labor markets in depopulating regions.

In this paper, we use a unique and detailed employer-employee matched micro level data for the Swedish regions to explore digitalization at the regional level for a ten-year period. The Swedish experience is of wider interest for several reasons. First, it is a very open economy characterized by large and growing trade with other countries, especially since joining the European Union in the early 1990s. It is thus more exposed than many other countries to digital disruption. Second, it is a highly advanced technological country with leading multi-national firms in telecoms, the transport sector, engineering and software

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development. Many of the large firms have factories and plants in the regions, some that have recently been affected by downsizing. And third, Sweden has an extensive system of re-training and support for displaced workers. This has contributed to a higher willingness among workers and labor unions to embrace new technologies and not resist technological change. The combination of these institutional features of the Swedish economy in conjunction with the rich level and quality of micro-data imply that the country can be seen as a well-documented laboratory for overall changes and how to respond to them.

In our empirical analysis, first, we identify the nature of the local labor markets in terms of industrial diversity using firm level data. Specifically, we differentiate the variety of economic activities at the local level in terms their “relatedness” with one another. The concept of related/unrelated variety for industrial diversity at the local level is a well-developed measure that builds on a large literature within regional economics. A hypothesis is that at the regional level, innovation and growth is more likely to take place if the industries are related to one another so that the relatedness facilitates *inter-industry job mobility*, but also the tasks and technologies are sufficiently relevant for each other to give birth to new industry specializations (Frenken et al. 2007, Neffke et al. 2011, Boschma et al. 2013).

An alternative hypothesis suggests that the unrelated nature of industries at the local level may stimulate more radical innovations, therefore, lead to new specializations (cf. Castaldi et al. 2015). Later, using individual level data, we identify the changes in the local labor pool in terms of the educational background alongside various individual level controls. We then ask whether regions with related industrial diversification/specialization perform better than their counterparts that host a higher degree of unrelated industries. We incorporate measures of accessibility and intensity of commuting into our analysis to elaborate further on the continuous nature of space and regional dependencies.

The paper contributes to the literature on structural change by focusing on specific industrial shifts at the local level. We do this by drawing on the recent literature that estimates the probabilities of automation for different tasks, Frey and Osborne (2013). By comparing the existing measures of economic diversification to our data for regional work, we are able to shed more light on how sensitive local labor markets are to further automation and digitalization. Due to the openness of Sweden, the changes may be quicker and broader than in other countries and thus be informative on policy issues that could smooth the social disruption of change while not hampering productivity growth.

JEL Classification: F15, F16, F61, J23, J24, J61, R11.

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