

# No more Workers in the Factories?

## Industrial Robots and Work in the Automotive Sector in Austria, in the Context of the New Automation Debate

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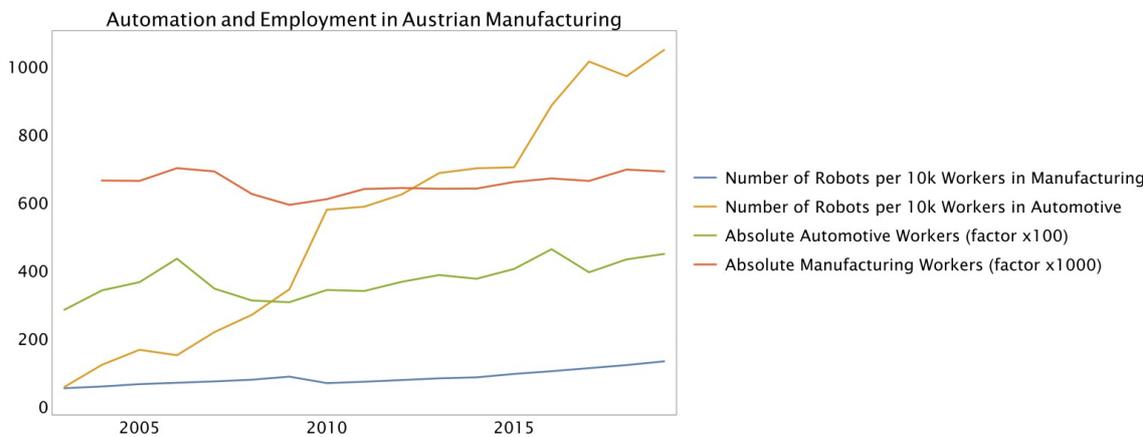


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### Central Tension

One of the central assumptions in the recent (New) "Automation Debate" (Benanav, 2020) is that productive technology leads to a "displacement effect" of living labour in production. This intuitive assumption, however, appears contradictory to the empirical observation that it is not those industries and countries, which have automated the most (measured as number of industrial robots per 10.000 workers) which have also de-industrialised the most (measured as the percentage of the industrial- relative to the total workforce). The present project asks why this is the case and how it can be explained for the specific case of the Austrian Automotive industry, for which this tension is particularly pronounced. The results of this theoretical and empirical engagement will be central to the overall conclusions of the present "Automation Debate" and its related literatures on De-Industrialisation, the "Productivity Paradox" and industrial concentration. A theoretical gap (lacking consideration of stagnation and productivity dynamics in relation to displacement) as well as empirical gap (lacking consideration of co-dependencies and industrial and national variations) in the literature will thus be addressed.



The figure on the left illustrates the issues at hand, based on data from the IFR (2019), Eurostat(2020) and Statistik-Austria. It shows that (1) the automotive sector is much more automated than general manufacturing, (2) employment has increased slightly therein and automation significantly, thus (3) the central tension of this research is validated. The table below illustrates the specific research questions and methodologies for engaging this tension. *Please note the incomparability of the shown variables based on their different scales. The graph is merely intended for illustrative purposes.*

### Specific Research Questions, Methodology and Data

Research Questions	Sampling	Data	Method	Analysis	1 <sup>st</sup> Order Interpretation
<b>RQ 1</b> <i>How can robot density (number of robots per 10.000 workers) and various market concentration indices (HHI and c-measures) explain the variation of the productivity dynamics in different national automotive sectors (AUT, BR; CAN; CZ; FR; GER; HU; IT; JPN; MEX; NL; PO; PORT; ROM; SLOV; SLO; SP; SWE; SWITZ; UK; US)?</i>	<b>Countries:</b> Traditionally strong Automotive Sectors but varying institutional conditions <b>Variables:</b> Industrial robot density; labour productivity; market structure indicators;	<b>Available Time Series :</b> 2010 till 2018  <b>Data bases</b> IFR OCED STAN Conference Board Orbis CompNet	<b>Multivariate analysis</b>	<b>Fixed Effects Model</b> based on Panel Data  <b>Monopoly-Capitalism</b>	The relationship of productivity, concentration and robot density in different automotive sectors
<b>RQ 2</b> <i>How can the interdependence of robot density, market concentration and productivity explain "technological displacement" (and manufacturing employment more generally) in the specific case of the Austrian automotive sector?</i>	<b>Variables:</b> Same as above+ relative manufacturing employment shares; manufacturing value added; output hours worked	Same as above + Statistics Bureau of Austria	<b>Institutional Economic Analysis</b>	<b>Pattern Modelling</b> of Stylized Facts and Auxiliary Contextual Data  <b>Regulation Theory</b>	The competing explanations for de-industrialization and specificity of the Austrian automotive sector
<b>RQ 3</b> <i>How do workers, management and engineering at an Austrian automotive manufacturing site conceptualize the use of automation technology and technological displacement?</i>	<b>Production Site</b> in Automotive Sector in Austria <b>Representatives of</b> Management and Engineering (all levels of hierarchy), Workers using Industrial Robots	Interview transcripts, ethnographic notes	<b>Qualitative case study</b> based on Interviews and Ethnography  In particular: Burawoy's „Extended Case Method“	<b>Thematic Analysis</b> Labour-Process Theory	The rationalization of investment and conceptualisation of use of industrial robots

### Selected Literature

Acemoglu, D. and Restrepo, P. (2017a). Robots and Jobs: Evidence from US Labour Markets. SSRN Electronic Journal. // Acemoglu, D. and Restrepo, P. (2017b). The Race between Machine and Man: Implications of Technology for Growth, Factor Shares and Employment. SSRN Electronic Journal. // Acemoglu, D. and Restrepo, P. (2017c). Low-Skill and High-Skill Automation. SSRN Electronic Journal. // Aglietta, M. (1979). A theory of capitalist regulation. Verso. // Autor, D. (2015). Why Are There Still So Many Jobs? The History and Future of Workplace Automation. Journal of Economic Perspectives, 29(3), pp.3-30. // Baran, P. and Sweezy, P. (1970). Monopoly Capital. Penguin Books. // Benanav, A. (2020). Automation and the Future of Work. Verso. // Braverman, H. (1976). Labour and monopoly capital. New York, N.Y.: Monthly Review. // Burawoy, M. (2009). The Extended Case Method: Four Countries, Four Decades, Four Great Transformations, and One Theoretical Tradition. University of California Press. // Brenner, N. (2006). Turbulence in the world economy. Verso. // Brilken, K., Chillas, S., Kzywdzinski, M., Marks, A. (2017). Labour Process Theory and the New Digital Workplace. In: The New Digital Workplace (pp.1-17) // Chang, H. (2002). Breaking the mould: an institutionalist political economy alternative to the neo-liberal theory of the market and the state. Cambridge Journal of Economics, // Clifton, J., Glasmeier, A., Gray, M. (2020). When machines think for us: the consequences for work and place. Cambridge Journal of Regions, Economy and Society, Volume 13 (1) // Compagnucci, F., Gentili, A., Valentini, E., Gallegati, M. (2019). Robotization and labour displacement in the manufacturing sectors of OECD countries: a panel VAR approach. // Dauth, W., Findeisen, S., Suedekum, J. and Woessner, N. (2017). German Robots – The Impact of Industrial Robots on Workers. CEPR Discussion Paper 12306. // Delfanti, A. (2019). Machine dispossession and augmented despotism: Digital work in an Amazon warehouse. New Media & Society. // Downward, P., & Mearman, A. (2007). Retroduction as mixed methods triangulation in economic research: Reorienting economics into social science. Cambridge Journal of Economics, 31(1), 77 // Gentili, A., Compagnucci, F., Gallegati, M., Valentini, E. (2020). Are machines stealing our jobs?. Cambridge Journal of Region, Economy and Society, Volume 13 (1), 153-173 // Krywdzinski, M. (2017). Automation, skill requirements and labour-use strategies: high-wage and low-wage approaches to high-tech manufacturing in the automotive industry. New Technology, Work and Employment, 32(3), 247-267. // Ligh, N., Kraft, B., Heoemyong, L. (2020). Robots, skill demand and manufacturing in US regional labour markets. Cambridge Journal of Regions, Economy and Society, 13 (1) // Moorby, K. (2018). High Tech, Low Growth: Robots and the Future of Work. Historical Materialism 26(4), 3-34. // Pfeifer, S. (2019). Produktivität konkret: Vom schweren Start der Lechtbauroboter. In: Marx und die Roboter. Ed: Butollo, F., Nuss, S., Dietz, Berlin. // Spencer, D. and Slater, G. (2020). No automation please, we're British: technology and the prospects for work. Cambridge Journal of Regions, Economy and Society, 13 (1) // Zehle, J., J. Sudekum, N. Woessner (2020). Robots and the rise of European superstar firms. DICE Discussion Paper 347. // Tregenna, F. (2009). Characterising deindustrialisation: An analysis of changes in manufacturing employment and output internationally. Cambridge Journal of Economics, 33(3) // Wajzman, J. (2017). Automation: is it really different this time?. The British Journal of Sociology, 68(1), pp.119-127. // Waldman-Brown, A. (2020). Redeployment or roboticized? Workers and automation in Ohio manufacturing SMEs, Cambridge Journal of Region, Economy and Society, 13 (1)