

Essay II

What is driving robotisation in the automotive value chain? Empirical evidence on the role of FDIs and domestic capabilities in technology adoption¹

This essay provides new empirical evidence on the role that inward Foreign Direct Investments (FDIs) and other host-country's specific factors play in the adoption of industrial robots – one of the key production technologies of the 4IR – with a specific focus on the global automotive value chain across 34 countries. Traditionally FDIs have been considered a crucial channel for technology adoption (Cantwell 1989; see Papanastassiou et al., 2020 for a recent and comprehensive review), but less is known about their role in the new 4IR scenario. With this contribution we analyse: (i) the role that FDIs have vis a vis other country and sectoral specific variables for the adoption of industrial robots in the automotive sectoral value chain; (ii) whether the dynamics observed in the automotive sector as a whole tend to differ across two chain segments, namely Automotive Assembly and Automotive Components, thus capturing also the heterogeneity within the same sector. We built an ad hoc dataset covering 34 countries across 11 years. In our empirical analysis we define the dependent variable as the operational stock of industrial robots within the automotive sector, and a series of independent variables, i.e. inward FDIs and a series of country and sector specific variables to proxy the readiness of the host-country's ecosystem (e.g. its innovativeness, and export competitiveness, and its level of industrial development). We use standard OLS estimations with fixed effects to study the main relationships between our dependent and independent variables. To control for endogeneity, that could arise from both reverse causality and omitted variables, we develop and deploy a new instrumental variable for the estimation of our model. By focusing on a specific sectoral value chain, our approach allows to capture the high degree of heterogeneity in technology adoption, even within the same sector. To conclude, we formulate a series of hypotheses from the econometric results, around the country specific factors that influence industrial robots' adoption.

¹ Part of this Essay II elaborates on the following published paper: "Robot adoption and FDI driven transformation in the automotive industry" International Journal of Automotive Technology and Management, Vol. 20, Issue 2, pp. 215-237, co-authored with Antonio Andreoni and Antonello Zanfei and it is cited as Anzolin et al., 2020.