



AUTOMATION AND THE DECLINE IN SOCIAL SECURITY DISABILITY INSURANCE APPLICATIONS

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Automation and the decline in social security disability insurance applications

We analyze the impact of various measures of local labor market automation on SSDI application rates, using data from 2005 to 2019 and focusing on commuting zones as the unit of yearly observation. The dependent variable is the SSDI application-to-population ratio, and key explanatory variables include established measures of automation, such as the share of labor at risk of automation and industrial robot penetration at the commuting-zone level. While automation explains about one-third of the reduction in SSDI applications, the decline is primarily driven by middle-aged workers, with the effect of industrial robots showing a stronger negative correlation with SSDI rates than general automation measures.

Automation in Local Labor Markets and Its Impact on SSDI Application Rates

Recent research shows that automation has driven most of the changes in the U.S. wage structure since 1980, with significant implications for labor markets. Automation could influence SSDI uptake by either displacing workers and lowering wages or by reducing the prevalence of injury-prone tasks. The predicted impact on SSDI applications is ambiguous: automation might create slack in the labor market, leading to more disability claims, or it could improve safety, resulting in fewer claims. In this paper, we estimate the relationship between exposure to automation technologies and SSDI application rates, using confidential SSDI application data at the commuting-zone level.

We analyze the effects of broad and narrow measures of automation, focusing on employment shares and industrial robot exposure, between 2005 and 2019. Our key variables include measures of automation based on the work of Autor et al. (2013) and Acemoglu and Gihleb (2020, 2022). We use a long- and stacked-differences model to estimate changes in population-adjusted SSDI applications by age and sex. Recognizing the challenges in identifying a causal relationship, we employ an instrumental variables approach: for employment shares, we use a Bartik-type instrument based on the 1990 routine employment share, and for industrial robot exposure, we use European robot adoption patterns as an instrument to predict U.S. adoption. These instruments are relevant in the first stage and help isolate the impact of automation on SSDI outcomes.



Automation Technology Reduced SSDI Application Rates

Application rates for the 18-64 age group decline with greater automation exposure, though the effects are not statistically significant with OLS but become significant using 2SLS. The overall results mask differences across age groups: the 35-54 age group experiences the largest negative effect, while the 55-64 group shows smaller yet significant negative impacts. Findings for industrial robot exposure mirror those for employment-share measures, with both methods showing null effects for the 18-34 group and significant negative effects for the 35-54 and 55-64 groups. Notably, the impact of industrial robot exposure is significant regardless of whether OLS or 2SLS is used, with the largest effect seen in the 35-54 age group.

Implications

- *The negative labor market impacts of high-risk automation occupations may be somewhat mitigated by a decrease in disability claims.*
- *Using SSA administrative data, we observe a consistent negative effect of automation on SSDI claims, suggesting a potential overall improvement in workforce health, contrasting with mixed results from previous research relying on subjective health measures.*

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