
Research Statement, November 2021

My research agenda focuses on technology, work, and skills using new large-scale data and methods. In my research, I combine empirical analysis with theoretical ideas and real-world exposure from fieldwork. This statement describes my job market paper, research papers, work in progress, and future work.

Job Market Paper

My job market paper, **“New Evidence on the Effect of Technology on Employment and Skill Demand,”** with Johannes Hirvonen and Aapo Stenhammar, investigates a central question in the debate on the future of work: what are the effects of technologies on employment and skill demand? The prediction that often dominates the conversation is that new technologies replace workers and increase skill demand. But this question has been difficult to tackle empirically for two reasons. First, measuring technologies and skills is challenging. Second, finding quasi-random variation in technology adoption is difficult.

This paper presents new evidence on technologies’ effects on employment and skill demand in manufacturing firms using new large-scale data and quasi-experimental research designs. The context is manufacturing in Finland, 1994–2018. We focus on new production technologies, such as robots and computer numerical control machines. The main research design focuses on an EU technology subsidy program that induced sharp increases in technology supply to specific firms. We use natural language processing (NLP) on the application text data to match the applicants on similarity and to estimate specific technologies’ effects. The data track firms and workers over time.

Our main result shows that technology investments led to increases in employment, and there was no differential change in typical measures of skill bias (e.g., the share of highly educated workers or production workers). These findings stand in contrast to the idea that technologies necessarily replace workers or increase skill demand.

To explain the result, we outline a theoretical framework that compares two types of technological change: process versus product. In process-type change, firms use technologies to do the same thing with lower costs. In product-type change, firms do new things. These views predict different effects and can be empirically tested. We find that the firms used new technologies to create new products and services, not to replace workers. We document this finding in several ways, using register, text, and survey data, and interviews and fieldwork. For example, a piston manufacturer included in the fieldwork invested in a robot and a CNC machine to manufacture new, more effective pistons.

Our results differ from the two views emphasized in the literature—that technologies replace labor or are skill biased—because the literature has focused more on process advances in mass production. In contrast, our context and a major part of modern manufacturing, is flexible and specialized, where product advances are more likely.

Research Papers

“Psychological Traits and Adaptation in the Labor Market:” Labor markets are in constant change. This paper, with Ramin Izadi, investigates how different personality traits and skills help adapt to changes in the labor market. We link together unique classified data from the Finnish Defense Forces on a psychological test covering 79% of the national male-population (due to universal conscription) with administrative data on work.

Classic theoretical research in economics emphasizes the value of skills, not only applied to tasks, but also in adapting to change. Empirically, little is known about these adaptation processes. The lack of research is mainly due to a lack of data. The military data of this project are globally unique and allow a contribution to the literature.

Our empirical strategy is a mass layoff design that contrasts workers who suddenly lost their jobs due to a mass layoff with similar workers who did not experience a mass layoff. We find that outward-oriented personality traits, e.g., extraversion, are relatively more valuable in times of change than in a steady state. The negative effect of a mass layoff on earnings is about 20% lower for those with extraversion scores one standard deviation above the mean. In contrast, more inward-oriented personality traits, e.g., conscientiousness, do not appear to help with adaptation. Education and cognitive performance are important in both times of change and in a steady state. The results suggest that the previously reported high returns to social skills in the labor market could be partly due to their role in adaptation.

“The Surprising Intergenerational Effects of Manufacturing Decline” investigates the long-term future of work through the lens of intergenerational adaptation. The paper focuses on the impact of vanishing factory jobs on children’s education using evidence from the US. The results are surprising: in places where manufacturing declined, high school dropout rates declined, and college attendance rose. The disappearance of manufacturing jobs led not only to a disadvantage but a positive response of adaptation and skill investment. The effects are driven by children whose parents work in manufacturing and are largest in places with high socioeconomic segregation. The results are consistent with the idea that the manufacturing decline increased returns to education and sociological accounts linking the working-class environment and children’s education.

“School vs. Action-Oriented Personalities in the Labor Market:” Extensive evidence shows that noncognitive skills improve labor-market success, but the channel is incompletely understood. In this paper with Ramin Izadi, we investigate how different dimensions of personality predict school vs. labor-market performance and how their value has changed over time. We answer these questions using personality and cognitive test data from mandatory military conscription for 79% of Finnish men. We document that action-oriented traits, such as activity and sociability, predict low school performance but high labor market performance. School-oriented traits, such as dutifulness, predict high school performance but are not independently valued in the labor market after controlling for school achievement. We further document that the labor-market premium for action-oriented personality has increased rapidly over the past two decades. Our theoretical model and evidence highlight two paths to labor-market success: one through school-oriented traits and formal skills, and one through action-oriented traits and informal skills.

Work in Progress

“Scarcity vs. Surplus: New Evidence on Labor Supply and Industrialization” with Jonas Mueller-Gastell asks whether machines and men are substitutes so that labor scarcity induces investment in technology, or complements so that labor surplus facilitates technology adoption. The project uses local labor supply shocks in Finland at the verge of industrialization to study how technology and labor supply interact. These shocks come from two sources: combat deaths and evacuations from invaded areas into designated towns during the Second World War, 1939–45. The project uses newly digitized local and plant-level data on technology use by type, employment, and organization. We find a positive effect of labor abundance on manufacturing development. Evidence on horsepower per person shows that additional labor does not crowd out capital but complements capital investment. Manufacturing employment share and gross value-added per person increase substantially across all empirical strategies, including instrumental-variable strategies based on military and evacuation plans.

Future Work

I plan to continue my work on understanding the causes and consequences of technological change and the role of different skills in the labor market. My research builds on new large-scale data that allow me to measure aspects that have previously been hard to measure. My research is more than measurement, however: I combine evidence, theoretical ideas, and real-world exposure to understand the evidence.

Due to the data-intensive approach, I aspire to gradually set up lab-style research with a team of researchers and actively seek external funding. As a concrete example, I plan to set up the infrastructure for using Finnish and Nordic microdata that will become available for other faculty and students. My research agenda has been funded by a number of organizations, including the Yrjö Jahnsson Foundation, Ministry of Economic Affairs and Employment, OP Group Research Foundation, and George and Obie Shultz Fund.

I am currently working to build partnerships to gain access to within-firm data and exploit natural and controlled experiments within organizations. I also expect the data and variation in my job market paper to be helpful for further investigating the consequences of technological change on workers, firms, and markets, as well as understanding the effects of firm subsidies and developing the methods for program evaluation.