

Research statement

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My main field of interest is **Labour Economics** with a focus on the **Economics of Education**. The main objective of my research is to understand how educational decisions adjust to changes in the labour market. My job-market paper marks the first step I took in this line of research, studying the effect of unemployment of parents. Going forward, I aim to examine the recent advancements in automation technology and the effects it had on education demand and supply. In my research I mostly use Applied Microeconometrics tools; but I have gained experience with structural estimation of models in some ongoing projects.

In my **job-market paper “Does Intelligence Shield Children from the Effects of Parental Unemployment?”**, I study how unemployment of parents affects long-term outcomes of adolescent children differentially by intelligence of children. Understanding this heterogeneity adds to the discussion of the role of intelligence in shaping our response to shocks. I study this question using the UK’s largest survey of households, the Understanding Society. For causal interpretation of the results I exploit the cross-sectional variation between individuals with employed and unemployed parents across intelligence in a difference-in-differences setting. The identifying assumption is that selection bias of parental unemployment is constant across intelligence (parallel trends). I provide evidence supporting the assumption based on observable pre-determined characteristics in an auxiliary data. I also show that even with high correlation of intelligence of parents and children, the parallel trends assumption holds if the persistence is constant across the distribution.

I present two key findings. First, the drop in educational attainment as a result of parental unemployment is worse among children with higher intelligence. This effect is almost entirely driven by higher-intelligence children of less-educated parents. This suggests that children at the top of the distribution are more susceptible to the loss of human capital investments in adolescence, consistent with the existing theory of skill formation. Second, later in life, higher intelligence helps to narrow the gap in labour supply and earnings of children whose parents were unemployed, but not in their wages. These results suggest that, despite the initial drawback, individuals find other ways to signal their ability on the job. I corroborate this hypothesis by studying the impact on occupational ranking of the very first jobs and age-profiles of earnings using the panel dimension of the dataset. Even though intelligence helps in the longer run, the results clearly indicate there is a room for policy to counteract the cost of parental unemployment on children. To shed more light on the channels I study the effect separately by gender of children and parents. I find that the effects are driven by loss of income/psychological distress in the family as only father’s unemployment generates these responses, but not through lower self-confidence as boys and girls respond in a similar manner.

In a related project, “**Multiple Imputation of University Degree Attainment**” together with Johanna Reuter we focus on types of higher education institutions in the UK. There is ample evidence that education quality is not homogeneous and that it matters for the outcomes. One measure of the quality is the institution itself, with elite universities considered to deliver higher-quality education. In the UK, the distinction between elite and non-elite universities is highly correlated with their age. In 1992 a number of polytechnic institutions were converted into universities. These new universities inherited many features of polytechnic institutions, including the perceived inferiority. Therefore, distinguishing between the new and old universities can be essential for many studies focusing on education in the UK. However, very few surveys provide such information. We offer a quick and easy method to infer the institution type based on multiple imputation technique. It also allows us to correctly account for the imputation uncertainty in the main analysis. We also study how the policy change in 1992 affected the premium of education in elite universities over time. Currently, we are waiting for the new wave of the dataset that will allow us to verify the imputation model.

Future research. Looking forward, I aim to expand the study of education and changing labour markets to the recent advancements in automation technology. First, I would like to reconstruct the evolution of automation risk of jobs over time by studying the evolution of tasks performed in each occupation. I will employ natural language processing algorithm to analyse the detailed task descriptions in ONet dataset and associate each task with automation risk. By using granular task descriptions I expect to be able to track dynamics of automation risk within each occupation accurately. Second, I would like to study how the automation risk of jobs has affected educational choices of students, both in terms of quantity and field of education, using the American Community Survey datasets. I would also like to study the broad effect of technological change on education as well as specifically automation risk of occupations. This can be important because the decisions of students may be driven by both the beliefs about a new equilibrium as well as the relative success of a given job in adapting to the new environment. For causal identification, I will use shift-share instruments based on occupational characteristics. Third, I would also like to study how these shifts in the labour market affected education supply of universities in terms of course offerings as well as financial accessibility. Disentangling the demand- and supply-side adjustments is important for understanding the direction of a new equilibrium.

Another line of research we pursue together with Aldo Rustichini focuses on the interaction between genetics and economics. In “**Fertility Choice and Intelligence in Developed Countries**”, joint with Aldo Rustichini and Michele Boldrin, we show that economic incentives in the labour market motivate women with higher intelligence to postpone childbearing and reduce the desired number of children. The main driver of this effect is complementarity between intelligence and effort in education and career advancement. We develop a dynamic model of joint choice of human capital investments and fertility over time and use the predictions to inform the reduced-form estimations in the data. Here, we do not allude to genetics, but the results hint at the interaction between economic environment and genetic evolution. Together with Aldo Rustichini, we study this question explicitly in “**Selection**

and the Roy Model". In particular, we study the evolution of genotypes in European populations over the last 14,000 years. This period is described by a shift from colder to warmer and from more to less volatile climate conditions. This has been linked to increased adoption of farming in the Near East, which spread throughout Europe over the next few millennia. We setup a simple Roy model where individuals with different skills choose between foraging and farming. The evolution of skills depends on the evolution of genotypes in the population, which we write as extended Wright-Fisher model. Thus, genotypes that facilitate higher skills and allow the individual to engage in a more productive occupation should experience positive selection across generations. We propose distance- and likelihood-based estimators based on simulations of the full model as well as simplified approximation to the model that can be fed into conventional software. Using the information about genotypes of both modern and ancient individuals we find evidence that, indeed, such selection took place. The genotypes currently favourable to educational attainment (our measure of skill) were approximately four percentage points more likely to carry over to the next generation. This result shows that historical transformations such as climate change or technological change can affect the distribution of genotypes and thus institutions hundreds of generations in the future. We are currently working on augmenting the analysis with an alternative source of information on the genetic history of population. It will also allow us to estimate a richer model that will help discern the speed of selection over time.